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OBSERVATIONS ON THE TREATMENT OF DYSMENORRHŒA WITH THE PLACENTAL EXTRACT "EMMENIN"*

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THE meaning of the term "dysmenorrhœa", "difficult monthly flow", has led to its use as a descriptive word to cover many types of distress of variable origin associated and often merely coinciding with menstruation. Dysmenorrhœa has been described as a disease in some texts on gynæcology. The purpose of this investigation was to observe the effects of the ether-insoluble orally active œstrogenic acetone extract of placenta, called "emmenin", in the treatment of dysmenorrhœa. Study was therefore limited to cases in which pains of an incapacitating character had their definite origin in forcible contractions in the non-pregnant uterus or Fallopian tubes which were free from new growths or diseases due to inflammation.

Motility in the human uterus.—During the course of a normal menstrual cycle it is always possible to record contractions in a healthy uterus. In the first half of the cycle they are frequent, regular, and small; after the sixteenth day they are less regular, stronger, and increase in force until just before the menses. Immediately preceding menstruation they become more regular at three minute intervals, and more forcible, with the internal uterine pressure rising to 100 mm. mercury. Moir,[9] having arrived at the above conclusions, has made the further observation that during menstruation the force of the contractions increases, causing an intrauterine pressure in excess of that produced in the second stage of labour and above that of normal blood pressure. He claims that the patient's sense of greatest discomfort coincides with a point after the summit of each contraction, and lasts until pressure falls to its lowest level. From the work of Novak and Reynolds,[12] Novak,[13] Morgan,[10, 11] Knaus and others one may safely conclude that œstrin (follicular hormone) acts as the augmentor and corpus luteum hormone as the inhibitor of these contractions. It would appear that unless the normal uterus is overstretched by the contents of its lumen the degree of activity of its muscle depends on the relative concentrations of these hormones in the blood. A relatively high concentration of œstrin is thought to be necessary for the development of inhibition by the luteal hormone. The effects of the gonadotropic hormone of the anterior pituitary on uterine motility therefore depend on the effects it produces in the ovary (Morgan). If the anterior pituitary stimulates œstrin production increased motility follows; on the other hand, if the concentration of corpus luteum in the blood is favoured quiescence results in the uterus. The existence of a reciprocal action between stimulation of the ovary by the anterior pituitary and repression of the anterior pituitary by the ovary through œstrin production (Hisaw) appears to be definite. The cause and the presence of uterine contractions having been determined it remains to associate forcible contractions with the production of pains.

Origin of pains in the uterus.—Uterine pains are an outstanding example of true visceral pain excited by muscular contraction in an organ that is considered to be practically insensitive when directly exposed to mechanical pain

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stimuli, with the possible exception of over-stretching, *e.g.*, forcible dilatation of the cervix. Moir intimates that the uterine ischæmia resulting from forcible contractions is the cause of the pains. Conclusions from the work of Sir Thomas Lewis[7] and his collaborators, Pickering, Rothschild, Wayne, and Laplace, on examples of somatic and visceral muscle exercise producing pain, might be taken to support this view. To quote.

> "A product of muscular contraction is directly or indirectly responsible for pain; that when successive muscular contractions occur in the absence of blood flow the state of the muscle alters progressively and the products accumulate in the tissue spaces; but that when muscular contractions occur in the presence of blood flow, although the same change happens in the muscle fibre, the products cannot rise to the same high level in the tissue space. Two factors are concerned in the production of pain, namely, the rate of energy expenditure on the one hand and the quantity of fresh blood passing to the muscle on the other. It is the lack of balance between these two which ultimately causes pain to occur; the lack of balance is embodied in the term 'relative ischæmia'. It is also known that pain that has once come will not disappear so long as the blood supply is suppressed, but that with full blood supply it will disappear quickly, and with poor blood supply, in time."

The pains resulting from contractions of the uterine musculature associated with menstruation and labour appear to have a reasonable explanation as being the result of a relative ischæmia. The continued pain in tonic contractions of the pregnant uterus during cases of obstructed labour is an example of pain remaining while circulation is suppressed, and a similar condition in the uterus is undoubtedly produced by the severe rhythmic contractions in dysmenorrhœa.

Pain may arise from the simple over-stretching of a muscle fibre. It is quite possible that this may be a factor when violent contractions occur in one group; other fibres may be subjected to a tension sufficient to cause pain from over-stretching.

THE PLACENTAL EXTRACT—EMMENIN

When a woman has suffered over a period of years from agonizing cramps at the time of the menstrual period, one cannot avoid being impressed by the curative effect of a normal pregnancy. At the beginning of pregnancy, under the apparent influence of the corpora lutea, uterine contractions with resulting pains are controlled. From the third month until term the uterus under the apparent control of the placenta is relatively quiescent, despite the presence of a higher concentration of œstrogenic substance, during which time the excretion of œstriol (tri-hydroxy-œstrin) in a combined form in the urine reaches a very high level (Marrian *et al.*). Following parturition it is seldom that menstrual pains of the same intensity as those previous to pregnancy affect the patient.

It is conceded that œstrin stimulates the growth of smooth muscle tissue, the interstitium, the submucosa, and the stratified epithelium, in the secondary sex organs (J. Freud *et al.*). That the marked growth change in the uterus during pregnancy results in the curative effect after parturition appears to be a well founded hypothesis. The assumption that this growth change is at least partially effected by the high concentration of the combined forms of œstriol and œstrone (keto-hydroxy-œstrin) existing during pregnancy, as evidenced by the excretion of the combined forms in the urine (Marrian *et al.*), and that an added supply of œstrin in the normal cycle would favour the inhibitory effect of progestin led us to hope, theoretically, for a curative effect in the virgin uterus from the administration of a placental extract which is known to contain œstriol in a combined form (Collip, Browne and Thomson).

"The name 'emmenin' has been given to an alcohol-soluble, ether-insoluble substance present in acetone extracts of human placentæ, active orally, and powerfully œstrogenic in immature rodents, though relatively inert in öophorectomized animals. It is regarded as a hydrolysable complex containing tri-hydroxy-œstrin; it does not appear to be ovary-stimulating, and it is suggested that its active principle is converted into some more potent form in the presence of ovarian tissue" (Collip, Browne, and Thomson[4]). A favourable report on the treatment of dysmenorrhœa was previously published by Campbell and Collip.[1] The fact that the substance is more active when taken by mouth made it a desirable one for our purpose, because administration is more convenient and it puts the onus of the treatment on the individual. The thoroughness shown by the patient in carrying out the directions gives one a valuable insight into her mental fortitude as well as into the extent of her desire to be relieved. The manufacturers of emmenin have assured us that this product is prepared after the method of Collip, biologically standardized, and supplied

with the approval of the Department of Biochemistry, McGill University. These facts, supported by previous critical observations of our own on its activity in the human, seemed to justify its clinical trial in a larger group of cases.

Our investigations, carried out under the direction of Prof. W. B. Hendry, began in August, 1933. Over 150 patients, suffering from incapacitating dysmenorrhœa have come under our observation during this eighteen-month period. It will be obvious that there was a percentage of this group in which emmenin therapy was not indicated. Mention will be made of the most interesting cases in this class. Previous to coming under our observation practically all of the patients in this series had used various remedies for relief. The list included chiefly some form of dried gland extract, sedatives, including mixtures containing codeia and various other analgæsic preparations. Not one had found a satisfactory régime of treatment; a few had given their system a fair trial; most of them had not been consistent. Originally we prescribed one dram of the emmenin daily for one week, starting immediately after the last menstruation, two drams during the time up to one week before the ensuing menstruation, and three drams during the last week. During the course of our investigation we observed that similar results were obtained by the simpler method of prescribing three drams daily for a period beginning two weeks before the ensuing menstruation, with a minimum course of ten days' treatment.

From the results obtained we have divided the patients into four main groups: (1) those which experienced complete relief; (2) those who experienced some degree of relief; (3) those in whom no relief was experienced; and (4) a group of unsatisfactory patients who for various reasons could not follow our directions. The charts in each of the first three groups include some of the most common symptoms associated with the pains and are self-explanatory. Nausea or vomiting, and backache are, we believe, due to reflex stimulation set up by the uterine contractions. This view is upheld to some extent by the fact that they were relieved by a lessening of the severity of the uterine pains. Headache occurred in a mild degree in only 17 cases in the series; we have no explanation of the cause, and could not determine whether or not its occurrence was a coincidence.

Knowledge obtained from pelvic examination was helpful in ruling out abnormal development and diseased conditions in the pelvis. Such conditions as under-developed uterus, a degree of acute flexion, a long vaginal cervix with small os, were no more significant as frequent findings than they were as absent ones. One is forced to believe that these findings should be considered normal in the nulliparous patient. The size of the uterus in the nullipara depends on the time examination is made. It is usually easy to detect an enlargement previous to the normal period, while the uterus is smaller in size and

TABLE I

COMPLETE RELIEF — 49

Disability			*Total*
(*a*) Associated	premenstrual	pains	13
(*b*) Permenstrual	menstrual dysmenorrhœa	pains alone	24
(*c*) Menstrual	dysmenorrhœa	alone	12
Hæmoglobin	average	88.7 per cent	

	Present	*Relieved*	*Not relieved*
Backache	18	17	1
Headache	6	3	3
Nausea or vomiting ..	16	15	1
Previous operations ...	4		
Economic influences ..	9		

Average length of treatment — five months.
Length of observation — over one year.
No return of symptoms after six months without treatment: 21.
Previous operations — one Cleland operation; three appendicectomies.

TABLE II

PARTIAL RELIEF — 27

Disability			*Total*
(*a*) Associated	premenstrual	pains	11
(*b*) Premenstrual	menstrual dysmenorrhœa	pains alone	3
(*c*) Menstrual	dysmenorrhœa	alone	14
Hæmoglobin	average	85.2 per cent	

	Present	*Relieved*	*Not relieved*
Backache	9	3	6
Headache	4	2	2
Nausea or vomiting ...	9	5	4

Group a.—Pains during flow persisted.
Group b.—All had a degree of relief.
Group c.—All were able to continue their ordinary pursuits during periods, but some pains persisted.
Average duration of treatment, five months.

TABLE III
NO RELIEF — 29

Disability			*Total*
(*a*) Associated	premenstrual	pains	11
(*b*) Premenstrual	menstrual dysmenorrhœa	pains alone	3
(*c*) Menstrual	dysmenorrhœa	alone	15
Hæmoglobin	average	74.5 per cent	

Backache	11
Headache	7
Nausea or vomiting	13
Previous operations	1
Economic influences	17
Mental influences	12

Operations — Uterine suspension for anteflexion with dilatation of cervix.

Unable to continue treatment	21
Observations still in progress	24

firmer in consistency about one week after the period.

In publishing results from work of this kind we are sensible of the obvious criticisms. The dosage, in view of the present-day conceptions of the effective dose of the pure crystalline preparations of œstrin, is admittedly small. Our best results were obtained largely in a class of women who one might consider to be a favoured one, in that they were all in good physical condition, relatively free from mental or economic distress, and in many cases apart from the too frequent disturbing influences of parental control and superstition. On the other hand, their activities were not controlled in any way, the average loss of time experienced before treatment as a result of being forced to lie up due to agonizing cramps was over one-half day, and nine of them had to contend with very definite economic and social difficulties. Without an exception, medicine was taken, appointments, though frequent, were kept to the minute, and in every way the patients in the group where relief was complete cooperated to make sure that the best possible effects would be obtained. These facts are stated to emphasize two vitally important points in the treatment of this condition by any method—(1) the patient must possess the intellectual fortitude necessary to carry out the treatment; (2) she must have confidence in a truthful explanation of the possible effects of the treatment to be followed.

It will be noted in the group under the heading "Partially relieved" that the average hæmoglobin is lower than in those experiencing complete relief, while in the group under no relief, not only is the hæmoglobin very low but the economic factor and mental influences were present from our observations in approximately 50 per cent. The main difficulties in the group who were unable to follow the prescribed course of treatment were due to economic reasons and mental instability merging into a state described by some authors as the psychogenic.

The average hæmoglobin can be taken in these reports as one index of general health, and it was accompanied in a relative degree by a state of dehydration, with resulting constipation. The effect of this state of health on the threshold for pains having their origin in the uterine musculature may possibly be explained by a conclusion from the work of Sir Thomas Lewis and his collaborators in other fields,— "Deficient aeration of the systemic blood caused by anæmia, or produced by breathing air poor in oxygen, provokes pain from the working somatic muscle and also from the heart in suitable subjects, is another firm link recently established." We are free to admit that improvement of this condition by the administration of reduced iron or ferrous carbonate, and by increasing the fluid intake, materially assisted us in obtaining some degree of relief in the second group.

By economic and social influences we mean such extreme conditions as over-work, work in an unhealthy atmosphere, either social or physical, and over-anxiety caused by financial inability to continue in their normal economic existence. Enforced lack of rest, whether from social obligations or business affiliations, was also included under this heading. In some cases such conditions intervened during the course of treatment and resulted in the symptoms and pains being exaggerated to a degree that could not be explained on the basis of normal consciousness in the individual.

From our observations we are convinced that consciousness to pains arising from the uterus is undoubtedly influenced by the activity of the higher centres. The term "mental influences" was used to include impressions on the mind such as suggestion, from whatever source, that might influence consciousness to pain stimuli, as well as the "psychogenic" factor, which, when referring to pains, would mean those originating in the mind. One can be fairly certain in observing the absence of these in-

fluences, but when they are thought to be present it is very difficult to determine the effects on the consciousness of the patient. With the exception of three cases we felt secure in claiming that all the patients under observation suffered from pains arising in the uterus. The three exceptions were incapacitated for a two-week period during every month; two of these patients remained in bed for the whole time, and the third claimed that she could not keep any position on account of enforced rest during the two weeks. That the pains were psychogenic was proved in one case. A spinster who had a Cleland operation following which pains were aggravated, and finally for whom, in order to save the ovarian function and to stop menstruation, a low supra-vaginal hysterectomy was performed, obtained no relief from so-called menstrual pains. The second patient had tried every known method for relief of pain unsuccessfully, was operated on by the Cleland method, following which psychogenic symptoms became so distressing that she had to be kept in a rest home. Operation was refused in the third case, but the patient managed to obtain in a two-month period a Cleland operation and later a laparotomy for the relief of pain, shortly after which we were informed that she had taken her life. Fortunately, such exaggeration of symptoms was limited to these three cases and they are mentioned simply as an example of operative procedure being a dangerous incident in the lives of people so afflicted. We were unable to observe any beneficial effect from the administration of emmenin to this type of case, despite the fact that many of the normal cases claimed and evidenced a brightened mental reaction from the relief they gained. To assist in the diagnosis, the psychopathic constitution may be briefly said to display itself as an unstable balance of the psychic impulses, an over-facile tendency to emotion, an over-swift interchange of mental phases, with an abnormally violent reaction of the psychic mechanism. The features most striking to the observer in the character of such sufferers are the heterogeneous medley of moods and whims, of sympathies and antipathies; of ideas in turn joyous, stern, gloomy, depressed and philosophical; of aspirations at first charged with energy, then dying away to nothing. These patients are usually the most naïve of egotists. They talk exclusively and persistently and absorbedly of themselves and their ailments, and consequently efforts to impress them with the importance of a course of treatment are of no avail on account of their heedlessness. In a case where features of the psychopathic constitution are in evidence, successful treatment demands the interested and intelligent cooperation of the guardian, the psychiatrist, and the physician, who should be in a position to give or obtain expert advice on the health and function of the pelvic organs.

A definition limiting true dysmenorrhœa to pain arising from muscular contractions of the uterus or tubes must not be taken as an inference that pain or pains from other sources do not give rise to complications in the picture, or may not be the sole cause of difficult monthly flow. It is our opinion that forcible uterine contractions may stimulate the origin of, or cause to be exaggerated, pains arising in neighbouring hollow structures, such as the bowel, appendix, ureters, or bladder. That pain having its origin in the ovary is exaggerated during the menstrual cycle is also our firm belief. In some cases not reported we observed such complicating conditions as large painful cystic ovaries, an accessory uterus with a lumen but no vaginal connection, trigonitis with bladder spasm, intestinal colic, and chronic appendicitis. It is obvious that emmenin or any type of hormone therapy is contra-indicated in the above conditions.

SUMMARY

A tentative explanation of the origin of uterine contractions causing the individual to be conscious of pains from the uterus has been outlined. The main factors that influence the patient's consciousness to the resulting pains have been discussed under influences from general health, economic and social conditions, and mental impressions. Our results from the administration of emmenin have convinced us that it is a valuable form of supplemental hormone therapy when the pains have a definite origin from forcible uterine contractions. When any of the factors that influence the patient's consciousness are present our results were materially improved by efforts to remove these influences. The general health is improved by the administration of ferrum redactum or

ferrous carbonate; by the supervision of ample diet, including the necessary ingredients such as proteins, calcium, and the vitamines, together with a copious fluid intake. Economic and social influences should be regulated as far as possible, and a minimum average period of eight hours' rest in bed out of twenty-four should be enforced. By our régime, including emmenin as a supplemental hormone factor, we have reduced operative interference to a minimum in the cases where our directions were followed. Forty-nine patients have experienced complete relief from pains and associated symptoms; 21 of this group have had no return of symptoms after a period of six months without emmenin. Twenty-seven patients experienced relief to a degree which enabled them to overlook the remaining discomfort. In 29 cases where no relief was obtained, actual loss of time was minimized by the administration of 3 to 5 grain doses of amidopyrine with 1/100th of a grain of atropine sulphate. The only operation recommended was the modified dilatation of cervix with incision of the internal os and packing, as described by Cleland. The successful treatment is individual, and while we conclude that emmenin has been a most valuable aid in obtaining good results we hope that this outline has defined the type of case in which its indication conforms with what one might consider to be intelligent medicinal therapy.

In conclusion, I wish to thank Professor W. B. Hendry for his generosity in giving much of his time to furnish kindly and helpful advice; also Dr. Edith Gordon, of the University of Toronto, for her enthusiastic cooperation in the direction of the work in her department.

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WATER INTOXICATION: REPORT OF A FATAL HUMAN CASE.—F. C. Helwig, C. B. Schutz and D. E. Curry, report a case in which death apparently resulted from water intoxication wherein the patient absorbed 9,000 c.c. of tap water by proctoclysis, and they have been able to produce identical symptoms and pathological changes in 7 consecutive rabbits by the administration of large amounts of tap water rectally. In their experimental studies, the CO_2 combining power of the blood plasma was never increased and was usually decreased. Explanation of the exact mechanism of water intoxication presents many interesting and complicated problems. It is difficult to account for the apparent susceptibility of the liver and brain for retaining fluid when tap water is given intestinally. It would appear that water intoxication was dependent on water elimination. The reason the kidneys fail to eliminate properly is unknown. The studies of Meier and Mann seem to indicate that some hepatic dysfunction may be of importance. Biopsy of the liver of the authors' patient at the time of operation showed a very advanced parenchymatous degeneration. Moreover, in the livers of all their experimental animals varying degrees of cloudy swelling were uniformly present. It has been impossible to produce an intoxication when hypotonic salt solution was administered or when 10 per cent chloride was given prior to the administration of water. One may speculate as to whether an upset in the normal salt-water balance produces water intoxication, or whether a lack of chlorides interferes in some way with the apparent relationship of the liver to renal output. The mechanism of the acute cerebral œdema is very puzzling. The most striking characteristic of the œdema was its interstitial character and the fact that at necropsy there was no evidence of increased production of cerebrospinal fluid. The ventricles were decreased in calibre and there was scarcely any cerebrospinal fluid present, while apparently, paradoxically, there was histological evidence of definite hyperactivity of the choroid plexus. Perhaps the most important factor in the production of the cerebral œdema, which is the major pathological lesion of water intoxication, is a disturbance in the normal isotonicity of the blood—*J. Am. M. Ass.*, 1935, **104:** 1569.

THE TREATMENT OF MENORRHAGIA AND METRORRHAGIA BY ANTERIOR PITUITARY-LIKE HORMONE*

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FAVOURABLE results in the treatment of irregular and profuse uterine bleeding by the use of anterior pituitary-like hormone have been reported by A. D. Campbell,[1] E. Novak[2] and A. Gabrielianz.[3] This paper is concerned with the treatment of a series of 39 patients suffering from menorrhagia and metrorrhagia due to endocrine unbalance.

The anterior pituitary-like hormone found in pregnancy urine, placenta and blood, is a gonadotropic hormone resembling the anterior pituitary gonadotropic hormone, but differing from it in some ways. The anterior pituitary hormone produces maturation of the follicles and formation of the corpus luteum in the hypophysectomized rat; the anterior pituitary-like hormone fails to do so. It further differs from the anterior pituitary hormone in that it fails to affect the development of the immature avian testes. It differs also in its effect on the immature rat ovary in that it rarely produces increase in weight of the ovary beyond 70 mg., whereas the anterior pituitary hormone causes a weight increase two or three times as great.[4, 10]

While these differences are noted, the resemblance between these two hormones is great, and it is still a possibility that they may be identical. The gonadotropic pituitary hormone appears to be composed of two fractions, as suggested by Zondek, A—the follicle-stimulating hormone and B—the luteinizing hormone; the anterior pituitary-like hormone from placenta is more comparable to the luteinizing fraction, while the hormone obtained from menopausal urine and the urine of castrates resembles more the follicle-stimulating fraction.[5] It is interesting to note that the anterior pituitary-like hormone when combined with the hormone obtained from menopausal urine will produce gonadotropic effects of follicle maturation and formation of corpus luteum even in hypophysectomized rats.

It is due to the luteinizing power of the anterior pituitary-like hormone that it has been recommended for the treatment of bleeding due to endocrine unbalance. In endometrial hyperplasia characterized by excessive uterine bleeding with occasional periods of amenorrhœa Schroeder has noted the absence of the corpus luteum in the ovary. The absence of the corpus luteum is undoubtedly a very constant finding, although Novak has failed to confirm it and our experience points to the occasional occurrence of the lutein body in this type of menorrhagia. Endometrial hyperplasia, however, is not a constant finding in all cases of functional menorrhagia. In our experience the characteristic microscopic picture of endometrial hyperplasia is probably not obtained in more than a third of these cases. In the absence of hyperplasia no characteristic changes can be noted on one microscopic examination of the endometrium in these functional cases of menorrhagia. It would seem reasonable to suppose, however, that repeated examinations of the endometrium at various stages of the cycle in the same patient might demonstrate constant variations from the normal endometrial cyclic phase. Such investigation, however, is quite impractical, necessitating repeated curettages in one patient.

A good working hypothesis for the physiology of menstruation, taking into consideration the various hormone factors combined with a correlation of the endometrial phase and the stage of follicle and lutein development in the ovary, may be summarized as follows. The post-menstrual phase of the normal menstrual cycle, associated with the developing follicle and regeneration and development of the endometrium, is under the control of the follicle-stimulating hormone A. The premenstrual hyperplasia of the endometrium associated with

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the developing corpus luteum is under the influence of the luteinizing hormone B. It may be assumed that the maintenance of a regular normal menstrual cycle of maturation and development of the follicle, ovulation and formation of the corpus luteum depends on a delicate relationship and balance between the two fractions A and B of the gonadotropic pituitary hormone.

At the present time the diagnosis of endocrine unbalance as a cause of disturbed menstrual function is frequently a negative one. Until the dysfunction can be definitely stated as ovarian or pituitary in origin, and a practical biological or chemical method devised to estimate the amount of gonadotropic hormone in the blood or urine, the use of female sex hormone therapy will be limited and the full value of such therapy not obtained.

In this series the diagnosis of endocrine unbalance was made by ruling out systemic disease affecting pituitary or ovary, hypo- or hyper-thyroidism, and pathological lesions of uterus, tubes and ovaries. If satisfactory results are to be obtained by the administration of anterior pituitary-like hormone it is essential that the presence of tubo-ovarian inflammatory disease, new growth and disturbed pelvic mechanics be diagnosed. This necessitates an accurate menstrual history and an exacting pelvic examination. If doubt exists in regard to the existence of carcinoma of the cervix or uterus, an examination under anæsthesia with cervical biopsy and curettage should be performed. Moderate, diffuse enlargement of the uterus with change to globular shape is a frequent finding in menorrhagia and in itself cannot be taken as a contraindication to the use of hormone therapy. Patients suffering from uterine bleeding after the menopause were not treated due to the high incidence of carcinoma in this type of case. All patients had blood pressure readings within normal limits, and a high percentage had basal metabolism estimations done. Two patients treated had positive Wassermann reactions but no other evidence of syphilis. The only other treatment given during the trial of the anterior pituitary-like hormone consisted in the administration of ferrum redactum for anæmia and cauterization of the cervix in mild cases of exocervicitis. If the cervix was badly eroded and lacerated it was taken as a contraindication for the use of the hormone.

The anterior pituitary-like hormone used in this clinical investigation was prepared by the method recommended by Collip.* It was administered hypodermically and should be injected slowly and intramuscularly. The treatment was started regardless of the menstrual phase and continued till a full course was administered with no cessation during menstruation. The medication was given in 1 c.c. doses for seven consecutive days, and then three days a week until eighteen to twenty-two doses had been given. This is the procedure recommended by Campbell. Variations in the number of injections were tried, hoping that equally satisfactory results might be obtained by fewer doses, but this was not the case. The injections were not followed by any general systemic reaction except in one case in which an urticaria developed. The local reaction varied from slight local soreness without evident reaction to rather marked local tenderness and superficial erythema. It was observed that the local reaction was much more intense following the first four or five injections than after subsequent ones. The majority of patients suffered only slight local tenderness.

For the purpose of presenting the results of this investigation the cases were divided into five groups: Group I, those with normal menstrual cycle and excessive flow; Group II, those with shortened menstrual cycle and excessive flow; Group III, those with completely irregular cycle and excessive or normal flow; Group IV, those with continuous bleeding; Group V, those with cyclic intermenstrual or premenstrual spotting.

It was with difficulty that an even greater number of groupings were avoided, as despite the relatively small number of patients treated great variations occurred in the type of menorrhagia and the menstrual cycle. Thus in Group I are included patients with minor variations of cycle up to six days, and in Group II are included some cases of metrorrhagia. The results of treatment of the Group I type of case are shown in Table I. In this group of fifteen patients the menorrhagia varied from moderate

* A sterile standardized solution of the hormone containing 100 biological day units per each cubic centimetre.

TABLE I.

NORMAL MENSTRUAL CYCLE WITH EXCESSIVE FLOW.

No.	*Duration of symptoms*	*Period of observation after A.P.L.*	*Results and subsequent history*
H.B.	12 months	3 months	Normal flow.
B.W.	9 months	12 months	Normal flow.
E.P.	9 months	14 months	Normal flow.
E.H.	2 years	1 year	Normal flow.
A.	6 months	9 months	Normal flow.
L.	2 years	3 months	Normal flow.
P.W.	1 year	4 months	Normal flow.
M.H.	2 years	1 year	Normal flow.
F.F.	14 months	1 year	Normal flow but periods still prolonged.
M.E.	2 years	1 year	Normal flow of variable duration.
C.M.	2 months	1 year	Normal flow. Relapse at end of year. Dilatation and curettage done. Endometrial hyperplasia diagnosed.
J.F.	3 months	8 months	Normal flow. Relapse after 3 months, controlled by further treatment.
S.	6 years	2 years	Normal flow. Recurrence after appendectomy, relieved by further treatment.
A.S.	9 months	14 months	Normal flow. Pregnancy occurred after 3 normal menstrual periods.
M.H.	2 years	1 year	Normal flow. One year before treatment had dilatation, curettage and öophorectomy, without relief.

SUMMARY

No. of cases	*Normal flow*	*Normal flow and duration*	*Failures*	*Relapses*
15	15	13	0	3

to severe necessitating resting in bed during part of each menstruation. The duration of the flow in most cases was increased one to four days. Two patients had had previous operations to relieve the menorrhagia, with either temporary or no relief. All patients in this group had a return to a normal amount of flow, but in two the duration of menstruation was variable or prolonged. Three had a recurrence of the menorrhagia. In one the menorrhagia returned one year after treatment. This patient was curetted and a diagnosis of endometrial hyperplasia made. The second patient had a relapse after three months, which was controlled by six more doses of the hormone; the third had a recurrence after an appendectomy. Ten doses were repeated with a satisfactory result. One patient became pregnant after three normal

TABLE II.

SHORTENED MENSTRUAL CYCLE WITH EXCESSIVE FLOW

No.	*Duration of symptoms*	*Period of observation after A.P.L.*	*Results and subsequent history*
Z.S.	6 months	15 months	Normal flow and interval.
R.	6 months	5 months	Normal flow and interval.
J.P.	12 months	7 months	Normal flow and interval.
R.S.	2 years	2 months	Normal flow and interval.
A.G.	1 year	1 year	Normal flow and interval.
O.H.	4 months	3 months	Normal flow and interval.
V.W.	2 years	1 year	Normal flow and interval.
Y.D.	10 months	4 months	Normal flow interval unchanged.
Dt.M.	9 months	1 year	Normal flow variable interval.
L.P.	3 years	6 months	Normal flow variable interval.
C.T.	2 years	1 year	Lessened flow, irregular. Operation revealed small myoma.
I.S.	2 years		Failure. Operation revealed bilateral salpingitis.
T.	6 months	1 year	Failure. Examination now reveals a fibroid in anterior wall of uterus.
D.M.	2 years	5 months	Normal flow interval unchanged.

SUMMARY

No. of cases	*Normal flow*	*Normal flow and cycle*	*Failures*	
14	11	7	3	one case of salpingitis two cases of myomata

menstrual periods. The results of treatment of the fourteen patients in Group II are shown in Table II. Eleven patients had a complete return to normal flow, and seven a return to both normal flow and cycle, leaving four patients with shortened or variable cycle. One patient had only a moderate decrease in flow and at operation a small intramural myoma was revealed. Two patients showed no change in menorrhagia or cycle. At operation unsuspected salpingitis was found in one and a myoma in the other.

Table III shows the results of treatment of the four patients in Group III. All these patients had had previous operations or had received x-ray or radium treatment with only partial or temporary relief of symptoms. Two were not benefited by the anterior pituitary-like hormone. One patient with endometrial hyperplasia had a return to normal menstruation for one year, when a relapse occurred; the second patient receiving benefits has had two menstrual periods without excessive flow.

The results of treatment of four patients suffering from continuous bleeding are shown in Table IV. One patient had been operated on for chronic pelvic inflammation causing metrorrhagia, at which time bilateral salpingectomy and right öophorectomy were done. Following operation, bleeding, varying from slight to severe, continued for three months, when treatment was started. The bleeding was temporarily increased and then stopped, to be followed by normal menstruation. Two patients were suffering from menorrhagia at puberty; both were relieved, but one has had two relapses, one of which was controlled by further hormone treatment. This patient is

TABLE III.

COMPLETELY IRREGULAR CYCLE WITH EXCESSIVE OR PROLONGED FLOW.

No.	*Duration of symptoms*	*Previous treatment*	*Flow*	*Results*	*Subsequent history*
S.S.	13 years	High voltage x-ray	Moderate but prolonged	No change	
B.	4 years	100 mg. of radium. High voltage x-ray	Excessive	No change	Submucous myoma
M.M.	2 years	Dilatation and curettage. Right öophorectomy. Endometrial hyperplasia diagnosed	Excessive	Normal flow. Normal interval	Relapse at end of year
S.	12 years	Dilatation and curettage. 600 mg.-hours radium; high voltage x-ray	Excessive	Normal flow and cycle	Only observed for 3 months

SUMMARY

No. of cases	*Return to normal menstruation*	*Failure*	*Relapse*
4	2	2	1—treated in another city by operation

TABLE IV.

CONTINUOUS BLEEDING

No.	*Duration of symptoms*	*Previous treatment*	*Flow*	*Results and subsequent history*
D.S.	3 months	Salpingectomy. Right öophorectomy	Variable	Normal flow and interval for over one year
F.T.	29 days	(puberty)	Excessive	Normal flow and interval for over one year
B.W.	2 years	(puberty)	Slight spotting	Failure. Dilatation and curettage resulted in 3 months' amenorrhœa
P.P.	3 months	(puberty)	Moderate to excessive	Normal flow and interval. Relapse at 4 months. A.P.L. repeated. Normal for 8 months; relapse again

SUMMARY

No. of cases	*Return to normal menstruation*	*Failure*	*Relapse*
4	3	1	1—under treatment at present

now receiving more treatment. The last case in this group is a peculiar one. With the onset of puberty, two years ago, slight spotting began and continued one or two days each week with no other evidence of menstruation. No improvement took place after anterior pituitary-like hormone treatment. Curettage was performed and resulted in three months' amenorrhœa, after which the almost daily bleeding recurred. This patient is still under observation.

ment show that of the 39 patients receiving treatment 31 obtained relief from the menorrhagia and 25 of these had a complete return to a normal menstrual cycle; 8 showed no apparent effect from treatment; 3 were proved to have small myomata; and 1, pelvic inflammation, leaving 4 cases in which the anterior pituitary-like hormone was completely unsuccessful and no cause for the menorrhagia and metrorrhagia was determined.

TABLE V.

CYCLIC INTERMENSTRUAL AND PREMENSTRUAL SPOTTING

No.	*Duration of symptoms*	*Previous operations*	*Period of observation after A.P.L.*	*Result*
A.	7 months			No change
L.G.	14 months	Dilatation, curettage and myomectomy for small myomata	2 years	3 months cure; relapse. More A.P.L. 4 month cure; relapse again

SUMMARY OF RESULTS

Group	*Number of cases*	*Normal flow*	*Normal flow and cycle*	*Failures*	*Relapses*
I	15	15	13	0	3—two relieved by further treatment
II	14	11	7	3—one case of salpingitis; two cases of myomata	0
III	4	2	2	2—one case of myoma	1—treated surgically
IV	4	3	3	1	1—Under treatment
V	2	0	0	2	0
Total	39	31	25	8	5

Group I—Normal menstrual cycle with excessive flow. Group II—Shortened menstrual cycle with excessive flow. Group III—Completely irregular cyle with excessive or prolonged flow. Group IV—Continuous bleeding. Group V—Cyclic intermenstrual and premenstrual spotting.

Table V shows the results of treatment of two patients suffering from cyclic intermenstrual and premenstrual spotting. One patient had previously received temporary relief from curettage. The anterior pituitary-like hormone had no apparent effect in this case. The second patient in this group complained of sterility and premenstrual spotting starting ten days before each menstruation. She had been previously operated upon, when myomectomy was performed for multiple small subserous myomata. Two courses of anterior pituitary-like hormone were given, each of which was followed by three months' relief from premenstrual spotting. This patient probably has small submucous myomata. As this supposition has not been confirmed by operation, this case is classified as a failure.

A general summary of the results of treat-

COMMENT

The anterior pituitary-like hormone is particularly valuable in treating menorrhagia and metrorrhagia due to endocrine unbalance in young women where hysterectomy or the production of an artificial menopause by x-ray or radium is very undesirable. In the group of cases reported only 9 patients were over forty years of age.

The immediate effect of treatment if the patient is menstruating when treatment is begun or menstruation occurs soon after is a temporary increase in the bleeding. Dysmenorrhœa, when present, was slightly aggravated by the anterior pituitary-like hormone.

The moderate menorrhagia developing after pregnancy encountered in young patients was very responsive to treatment. Many of the patients in this series complained of dizziness

which was very frequently relieved early in the course of treatment before any improvement in the anæmia had occurred. Many patients volunteered the information that their general sense of well-being was markedly improved.

It has been suggested by Greenhill,[7] Frank[8] and Wolff[9] that the use of the female sex hormones may do irreparable harm to the patient. In regard to the anterior pituitary-like hormone a theoretical possibility would be the excessive formation of corpora lutea. This condition is a frequent finding in hydatidiform mole, where huge amounts of gonadotropic hormone are produced. Such huge quantities certainly would not be given therapeutically, and even if such excessive luteinization did occur from therapeutic doses, once the administration of the hormone is discontinued, retrogressive changes should occur in the corpora lutea as they do in hydatidiform mole when it is expelled. The real danger in the use of anterior pituitary-like hormone is the possibility that it will be used indiscriminately for the treatment of menorrhagia and metrorrhagia without proper examination to rule out malignant disease. It cannot be too strongly emphasized that all patients suffering from menorrhagia or metrorrhagia should have the cervix carefully inspected, and if there is any doubt of the possible existence of carcinoma of cervix or endometrium section of the cervix and curettage should be performed.

CONCLUSIONS

Thirty-nine cases of menorrhagia and metrorrhagia, presumably due to endocrine unbalance, have been treated by anterior pituitary-like hormone; 31 were relieved of the menorrhagia and 25 had a complete return to normal menstruation. Of the 8 patients who failed to respond to treatment 4 were proved to have local pelvic lesions sufficient to cause the complaint. From an analysis of these results it is concluded:

1. The anterior pituitary-like hormone is a valuable therapeutic agent for the treatment of menorrhagia and metrorrhagia due to endocrine unbalance.

2. Successful results from this form of therapy can only be obtained in the absence of pathological lesions in the genital tract. Moderate diffuse enlargement of the uterus is frequently encountered in functional bleeding and is not a contraindication to hormone therapy.

3. Harmful effects from the administration of anterior pituitary-like hormone are considered unlikely, and are outweighed by the excellent therapeutic results.

4. Improvement in the patient's general sense of well-being after treatment is noted, and frequent relief of dizziness, when associated with menorrhagia, is observed.

5. More exacting methods of diagnosis of pituitary and ovarian dysfunction are necessary before the full value of anterior pituitary-like hormone therapy will be realized.

I wish to express my thanks to Professor W. B. Hendry for making it possible to carry out this investigation; also to Drs. W. G. Cosbie, W. A. Scott and H. B. Van Wyck for permission to include their private cases in this series. The preparation of the anterior pituitary-like hormone used in this investigation was a standardized solution known as "A.P.L." It was supplied by the manufacturers, Ayerst, McKenna and Harrison.

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THE DIAGNOSIS AND TREATMENT OF MALIGNANT HYPERTENSION*

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SINCE the introduction of the sphygmomanometer in the latter part of the 19th century, clinicians have been impressed with the frequency of arterial hypertension under various conditions. Thanks to the clinical studies of Huchard,[1] of France, Clifford Allbutt,[2] of England, T. C. Janeway,[3] of America, and many others, there gradually has developed the clinical picture termed pre-sclerosis, hyperplasia, and essential hypertension. A more extensive study in the last decade or so by Keith[4] and his associates at the Mayo Clinic confirmed the observations of Volhard and Fahr[5] that, while many cases of essential hypertension run a benign course, sometimes of many years' duration, others were associated with a shorter and more stormy course, rather inaptly described by the term "malignant". Be this as it may, it seems to me my first duty is to discuss with you briefly what we understand by benign, or ordinary, essential hypertension. O'Hare[6] aptly defines it as "a circulatory disorder, characterized primarily by high blood pressure, involving more or less generally the arterioles of the body". He points out that the progressive arteriolar sclerosis results in diminished blood supply to various organs, and consequently secondary atrophic changes take place.

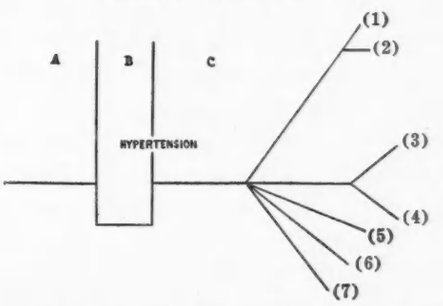
Etiology.—The exact exciting factor in essential hypertension is still unknown. Various theories have been advanced, but always shortly discarded. The predisposing factors that we would stress, with O'Hare, are heredity, overwork of the nervous system, and overeating. It is doubtful whether infections, even typhoid fever or intoxications, or even lead and tobacco, play any significant rôle.

It is now generally understood that there are at least two stages, possibly three, in the development of the hypertension, and we would call attention to the scheme drawn by O'Hare (Table I), as illustrating very well the modern view of the development of this disease picture.

A. The pre-hypertensive stage.—In the children of hypertensive families evidences appear even in the second decade, often about puberty, when the adolescent will reveal a high colour, a liability to flush and blush on the slightest provocation, nervous irritability and instability, in spite of a mental alertness above the average. These persons very often have cold sweaty hands and may be the subjects of mild hæmorrhages from the nose in the form of epistaxis, or from the uterus in the form of metrorrhagia. When such a person grows to manhood or womanhood he or she is known to all as a vigorous intensive worker, a successful business man, a leader in his community or a successful housewife and mother, active in all her social obligations. The man prides himself that he does not require a holiday and is too busy to relax, except for a short week-end in the country. His chief form of amusement is over-eating, though he prides himself in his temperance in the use of alcohol

TABLE I

DEVELOPMENT OF CARDIO-VASCULAR RENAL DISEASE
(Modified from O'Hare)



A—Pre-hypertension stage (1st to 35th year).
B—Fluctuating stage (30th to 40th year).
C—Hypertension stage (40th to 45th year).

(1) Cerebral arteriosclerosis.
(2) Cerebral hæmorrhage.
(3) Coronary arteriosclerosis (angina).
(4) Cardiac sclerosis.
(5) Renal arteriosclerosis:
  (a) Benign
  (b) Malignant nephrosclerosis.
(6) Pancreatic arteriosclerosis (diabetes).
(7) Peripheral arteriosclerosis:
  (a) Claudication
  (b) Gangrene.

* A paper read on November 14, 1934, at the Annual Clinical Day, Hamilton General Hospital and District No. 4, Ontario Medical Association.

and tobacco. He gradually becomes overweight and more and more ruddy of complexion.

B. The fluctuating stage.—Usually between the 30th and 40th year the patient will reveal a slight increase in the blood pressure. This is very often an accidental finding in the course of a life insurance examination or a routine health "check up". During this stage, however, the blood pressure is not constant and even at the maximum the systolic rarely reaches above 150 or 160 m.m. We are still not in agreement as to what may be considered an abnormal blood pressure, but it is my own firm belief that anything above 150 in a patient in the fourth decade, is certainly pathological, whether it be constant or fluctuating.

C. The hypertensive stage.—As a rule, somewhere in the fifth decade, or between the 40th and the 45th year, the hypertension becomes permanent. Again, often without known symptoms the patient may come up for re-examination before a life insurance physician and be rejected because of the discovery of blood pressure of 180/100 m.m. Usually a careful inquiry will, however, elicit some symptoms which the patient did not think significant, namely, fatigability and irritability, nervousness, and insomnia — symptoms usually assigned by the patient to overwork and business worry. Very characteristic, however, is the sub-occipital headache on awakening in the morning. Why this disappears in the course of the day, it is difficult to explain. Repeated slight nose-bleeds make their appearance; blurring of vision may become manifest; shortness of breath, palpitation of the heart, precordial pain, and even œdema of the ankles, are symptoms of a well-developed case in its later stages. Some suffer chiefly from cold hands and feet and sensations of pins and needles in the extremities.

Physical examination at this stage will reveal a high colour. There is very often a tendency to put on weight, with a general appearance of good physical health. Examination of the fundi will reveal sclerosis of the retinal arteries with nicking of the veins. The heart will be found to be enlarged, both to percussion and to the x-ray. The aortic second sound will be accentuated, and the electrocardiogram will show a damaged heart muscle. A routine urine examination will probably show a trace of albumin and a few hyaline casts.

In the ordinary benign course involvement of the main arteries *gradually* develops, *viz.*, the cerebral, coronary, renal, pancreatic and peripheral. As a result of cerebral arteriosclerosis, cerebral angiospasm, with temporary loss of speech and power of one hand, may occur. In cerebral thrombosis or hæmorrhage hemiplegia and aphasia will gradually or suddenly develop. Generalized convulsions and coma, from cerebral œdema, also are worthy of note, and in the more progressive cases psychoses of varying grade are inevitable. If the coronary artery is involved angina pectoris, and even coronary occlusion, will appear. Owing to involvement of the smaller branches of the coronaries, myocardial fibrosis with resulting myocardial insufficiency develops. Owing to disease of the renal artery and its branches varying grades of injury result, from a patchy sclerosis with mild albuminuria and cylindruria to a more generalized involvement, with ultimate shrinkage of the kidney and the development of the picture which we formerly termed "chronic interstitial nephritis" but now call "chronic hypertensive nephritis".

The rate of progress.—This is usually slow, and all of us have observed cases for ten to fifteen years with hypertension and no major cardiac, cerebral or renal symptoms. In such, the course is benign. On the other hand in a few cases the "process spreads like a prairie fire", to quote O'Hare once more, and the patient may die in less than twelve months from the date of onset. The course in such a case is surely "malignant". In this group there is an acute arteriolitis, possibly the result of a superimposed infection. In any event, this acute rapidly progressive group has been termed "malignant" by Keith, and the term has been generally adopted in our medical text-books and journals of the day. It is true that Volhard and Fahr in 1914 described the condition of malignant sclerosis or "boesartige Hypertension", an analogous condition usually occurring at a somewhat later stage than those that Keith and his associates have termed malignant. Keith, from a study of 81 cases at the Mayo Clinic, was struck with the retinal lesion as the most significant finding. He insists that malignant hypertension can be distinguished from the benign form by the persistently high blood pressure and the rapid course of the disease, and that it may arise apparently *ipso facto,* particularly in the

young, but frequently is a later stage of the benign type. He admits that the course in both malignant hypertension and chronic glomerular nephritis may be equally stormy and as rapidly fatal, but there are many dissimilar features. Anæmia and renal insufficiency that are so characteristic in the latter may be absent in the former. The retinitis too can be differentiated. In malignant hypertension the œdema of the retina is less extensive and less dense. There is little tendency to the formation of pericapillary "snowbank" exudates. The hyperæmia of the disc is in marked contrast to the anæmia of the disc and the retina that is seen in the retinitis of nephritis; sclerosis of the retinal vessels is always present in malignant hypertension and is usually absent in chronic nephritis. However, Keith admits that a definite relationship is not evident between the severity of the retinitis of malignant hypertension and the degree of impairment of renal function. In other words, a severe retinitis may occur with adequate renal function and without retention of urea; however, a urea retention is oftener present when the retinitis is severe than when it is moderate. Further, while chronic glomerular nephritis occurs in the second or third decades, malignant hypertension develops in the fourth decade. Other writers, as Elwyn,[7] apply the term "benign" and "malignant" only to the renal arteriosclerosis, and speak of benign cases as renal sclerosis without renal insufficiency and malignant cases as renal arteriosclerosis with renal insufficiency. They point out that when the greater number of the glomeruli are not at all affected the clinical course is one of chronic hypertension without renal insufficiency. It becomes more prominent, of course, in late middle life, or what Allbutt calls "senescence". The blood pressure remains high for many years, yet the patients do not die from renal insufficiency but from some intercurrent infection, from coronary artery disease, from myocardial insufficiency, or from some arterial cerebral accident. This is what Loehlein described as the "nephro-cirrhosis arteriosclerotica lenta". On the other hand, malignant renal sclerosis occurs only in a small group of cases in which after a prolonged hypertension renal insufficiency develops. These cases no doubt correspond to the "primary contracted kidney" or the "genuine contracted kidney" of the older writers. Their recognition, as distinct from chronic glomerular nephritis, we owe to Volhard and Fahr.

While time will not permit us to discuss fully the pathology of malignant nephrosclerosis, which has been so fully described by Volhard and Fahr, and, more recently, by McMahon,[9] we must briefly mention its more striking factors. There is a hypertrophy of the left ventricle of the heart with mottling and pallor of the heart muscle. The kidneys themselves are rather small, and show the scarred surface so commonly seen in the so-called "granular" kidney. While there is an extensive arteriosclerosis of all the vessels in the body, the sclerosis of the small arteries and arterioles of the kidney is of an extreme degree; both show thickening with fatty and hyaline degeneration of their walls; in many the lumina of the vessels are completely closed. Further, there is an inflammation of the intima, with necrosis of the vessel wall. In other words, according to Elwyn, there are both arteriolitis and arteriosclerosis. Moreover, further microscopic study will reveal a still more diffuse process involving not only the arterioles but the glomeruli, the tubules, and the stroma, leading almost to reconstruction of the parenchyma and sclerosis of the interstitial tissue (McMahon). A most striking and characteristic feature is a dilatation of the capillaries of the glomeruli, with hæmorrhages into the capsular space and the presence of fibrin occluding the capillary lumina and extending out into the somewhat loose intercellular basement membrane and ground substance. Evidently a focal inflammatory process of both arterioles and glomeruli has been added to the arteriosclerosis. While these cases are rare, they increase in frequency, the more carefully one searches for them.

Clinically, malignant nephrosclerosis is characterized by an elevated blood pressure, a large heart, an increase in the non-protein nitrogen of the blood, a decrease in the concentrating and diluting power of the kidney, polyuria, neuroretinitis and uræmia. Œdema may or may not be present. The urine will of course show albumin, granular, hyaline, and a few cellular, casts, with leucocytes and even a varying number of blood cells. While similar symptoms and laboratory findings may occur in chronic glomerular nephritis, in malignant nephrosclerosis cardio-vascular symptoms stand in the fore-

ground and are developed to a remarkable degree.

Treatment.—As in so many of the degenerative lesions, *prevention* is the best cure, and in the case of a predisposed individual with a family history and the strenuous mode of life, one should advise the patient to go slower, and to avoid all additional stress and strain; to rest for half an hour after each meal, and to take regular holidays. The importance of a warning against overeating I would also emphasize, bearing in mind the old adage that more men are killed by the platter than by fire and sword. It is no doubt wise to remove all foci of infections in teeth, tonsils, prostate, etc. When the disease is established, one should also advise regular daily exercise, plenty of rest and sleep. The use of a saline morning purge, once or twice a week, will help to keep the drains flushed, even if one has no faith in intestinal intoxication. An occasional course of calomel is advised by Clifford Allbutt. The use of mild sedatives, particularly of luminal, will lessen nerve tension and the sense of pressure, and, of course, if taken before bed time, will promote sleep. While many modern clinicians, as O'Hare[10] and Mosenthal,[11] cannot see the necessity of restriction of the protein and salt content of the food, we nevertheless have been in the habit of prescribing a 60 gram protein and salt-free diet to our hypertensives, as there is always the probability of slight renal damage and the possibility of the development of renal insufficiency. While iodides have gone out of use, except in the clear-cut case of syphilis of the circulatory apparatus, we personally still prescribe them in small doses, 10 grains, three times a day, for three weeks out of each month, largely as a placebo, but partly because our patients seem to do well on the drug, and at least the drug is harmless. In regard to the hypertension itself, drugs have failed us. Nitroglycerine and sodium nitrite have purely transitory effects. Following the suggestion of Fineberg,[12] in 1930, we tried potassium thiocyanate in doses of one and a half grains, three times a day, for a three months' period. While this author reports a fall of 30 millimetres or more in 57 per cent of his 22 cases, we could get no such effect. Similarly bismuth subnitrate, in ten grain doses, as recommended by Stieglitz,[13] we have tried, but without any noticeable benefit.

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SPECIFIC TUMOUR ANTIBODIES.—That cancer cells act as an irritant and stimulate a tissue-defence mechanism against them is accepted by all pathologists. Lumsden, Macrae, and Skipper have carried their researches on tissue cultures of neoplastic cells as far as demonstrating the presence in the blood of antibodies against specific tumours. Their technique consists of applying the serum to be tested to an active tissue culture of Jensen's rat sarcoma cells in which only the free migrating cells are present; they thus eliminate the difficulties of previous experiments, where immune sera killed the free cells but were unable to get at the central mass of the piece of tissue used as the culture. They demonstrate conclusively that normal sera have no effect on the growing Jensen's rat sarcoma cells; but that sera from rats in which an implanted sarcoma is regressing—that is, rats which are becoming "immune" to the growth—kill the cells in 10 to 20 minutes. These sera have no effect on tissue cultures from normal tissues such as kidney epithelium, but are almost equally effective on mouse carcinoma cells. They were able to show that by injecting sarcoma cells into rats which do not develop the tumour, *i.e.*, which are primarily "immune", they could stimulate the formation of these humoral antibodies. They were also able to follow the titre by a rough quantitative measurement, and find that the "antibodies" thus produced do not last long. They put forward the suggestion that it is the power to produce antibodies to the tumour cells rather than their actual presence which is the essential factor in tumour immunity.—*J. Path. & Bact.*, 1934, **39**: 595.

A NEW METHOD OF TREATING FRACTURES IN THE DISTAL THIRD OF THE FEMUR*

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FRACTURES of the distal third of the femur, under which category we classify the inter- and supra-condylar forms, have been a source of trouble not only in reducing but also in maintaining apposition. These fractures no longer prove difficult to manage when employing a method of fracture treatment, the chief principles of which are: (a) a new and simple means of overcoming the deformity caused by the gastrocnemius and allied muscles, and (b) the utilization of the "well leg" for countertraction. A working analysis of this mode of reducing supracondylar fractures includes, first, correcting the posterior displacement of the distal fragment by wire or pin transfixion, which also acts as traction agent; secondly, incorporating this transfixion in a plaster-of-Paris encasement to prevent recurrence of posterior deformity and to supply means of immobilizing the fracture; and, thirdly, using an original splint, whereby the "well leg" only is required for countertraction.

Our technique differs in many respects from the prevailing manner of treating these fractures. Traction is not applied with the knee-joint in flexion, as it is not necessary here to relax the gastrocnemius; on the contrary, by immediate anterior replacement and fixation of the distal third, the lower extremity is held with the knee in full extension, thereby eliminating delay in completing reduction — a recourse so often advocated. Under the current mode these fractures call for the maximum of after-care, while this incorporated-pin method requires minimum attention. For this type of fracture it is obligatory to do more than to correct the shortening and to overcome the lateral displacement; it is necessary to overcome the posterior displacement of the distal fragment, besides correcting the plantar contraction of the foot. We are all aware that the pull of the calf muscles is chiefly responsible for the posterior displacement. Moreover, since the powerful gastrocnemius has its origin in the posterior surface of the femur just above the condyles and its insertion into the os calcis its contraction is the source of a double deformity — a foot-drop and the posterior femoral deformity.

Reduction

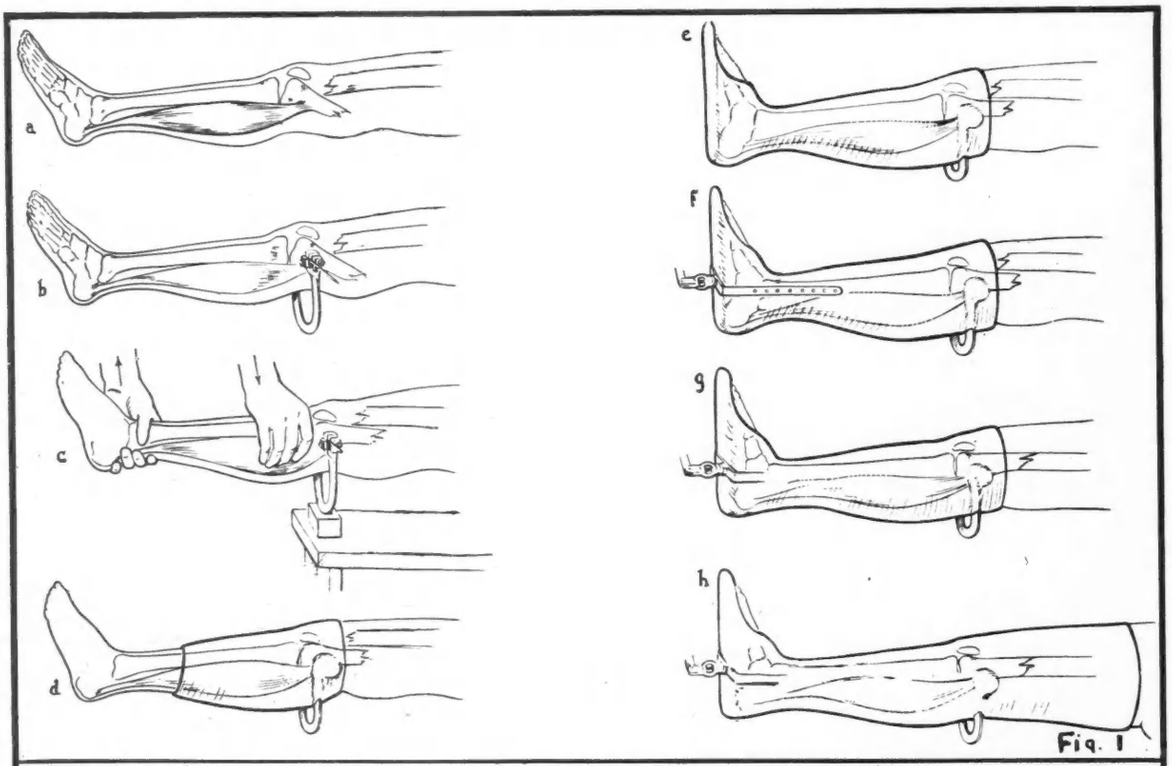
A hypodermic injection and preliminary roentgenogram usually precede reduction (Fig. 1). Local anæsthesia, as popularized by Böhler, may be used, injecting 2 per cent novocaine into and around the fractured ends. We likewise anæsthetize the area of the insertion of the wire or pin, which is put transversely through the centre of the condyles at their superior edge (Fig. 1-b). The essence of this technique is to overcome the posterior displacement of the distal fragment prior to reducing the fracture itself. The key factor is not only the obtaining but the maintaining of extension at the knee, which may be accomplished by the means of either pin or wire. Our preference is for the pin. When the pin is used (Fig. 2), the initial step of overcoming the posterior displacement of the distal fragment, is made by pulling anteriorly on the ends of the pin until the lower fragment is in the same straight line as the tibia, and thus, with the knee in full extension, the first segment of the cast is applied. When using wire the horseshoe may be placed anteriorly or posteriorly to the femur. In the latter event, as demonstrated in Fig. 1, pressure is applied to the tibia posteriorly until the knee is in full extension (Fig. 1-c), while an assistant steadies the horseshoe. This initial correction is held while a padded or unpadded cast is applied from a level of one to three inches above the wire down to the lower third of the leg. This extension of plaster only an inch or so superiorly to the transfixion site prevents immobilization of any portion of the upper fragment, but the distal femoral fragment is directly im-

* Presented at the meeting of the Victoria Medical Society on December 3, 1934.

mobilized by the transfixion which is incorporated in the cast (Fig. 1-d). In a few minutes the plaster is set sufficiently to hold firmly, after which there is no longer any danger of posterior displacement of the lower third.

The foot is now set at a right angle without fear of displacing this distal fragment, after which the cast is extended to a level of about an inch beyond the toes (Fig. 1-e). This plaster segment overcomes any danger of toe- or foot-drop; it also protects the toes from irritation of the bedding. Now that the gastrocnemius' displacing pull at both knee and ankle is completely neutralized, this muscle can be ignored in subsequent procedures.

The next step is to reduce the fracture itself by the application of longitudinal traction, just as for any central shaft fracture (Fig. 1-f and g). However, instead of recumbency with the



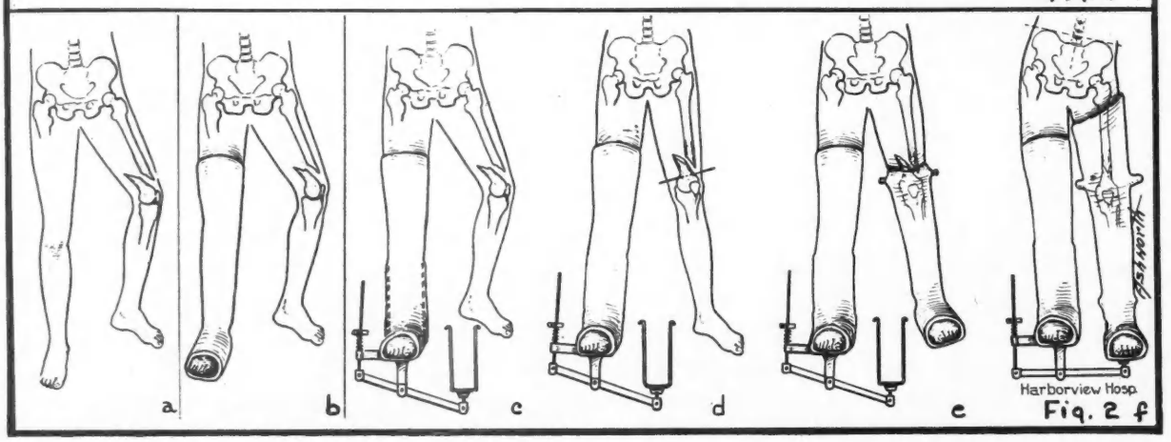


FIG. 1.—Supracondylar fracture reduced with the aid of Kirschner wire. a, Usual posterior displacement; site is indicated for insertion of wire, pin or tongs. b, Wire inserted through lower fragment. c, Pressure applied forces the knee into full extension while an assistant steadies the horseshoe. d, Segment of cast applied incorporating wire and horseshoe. e, Equinus corrected and cast extended over foot. f, "Well-leg" splint attached. g, Traction exerted and reduction completed. h, Cast extended to groin.

FIG. 2.—Steps illustrating the application of the splint in supracondylar fractures when a Steinmann pin is used. a, Fracture of left femur distal 1/3; b, cast on "well leg" to mid-thigh; c, splint incorporated in cast; d, pin through femur; e, pin incorporated in cast; f, splint attached, traction applied — cast extended to groin.

ordinarily needed ropes, weights and pulleys, it is much easier on both patient and surgeon to use the "well-leg" splint (Fig. 3), a method which permits skeletal traction on the injured leg while simultaneously deriving all countertraction from the "well leg".

Routine Technique

Application of the "well-leg" splint in the treatment of supracondylar fractures of the femur is similar to that in other femoral and hip shaft fractures, and proceeds in accordance with the steps outlined in Fig. 2.[1, 2]

As illustrated, a cast is applied to the "well leg", extending from one inch beyond the toes to mid-thigh (Fig. 2-b). This can be unpadded, or padded with sheet-wadding and a thin piece of soft felt covering the sole of the foot. In order to ensure a balanced distribution of counteraction pressure the whole plantar surface of the cast is reinforced with a thick plaster bandage, applied while the foot is held at right angles and the sole in external rotation or eversion, both cast and reinforcement being accurately moulded to fit the sole. Before attaching the countertraction stirrup to this cast the plaster is cut out over both malleoli. Subsequent technique, that is, management of the injured extremity, is illustrated in Fig. 1. Reduction is completed by furnishing the required traction, and rotating the leg to its normal position. The bone can frequently be felt slipping into place as the lever arm reaches the optimum position which is generally at right angles to the longitudinal axis of the well leg. After roentgenographic check a snugly-fitting cast is extended from the pin to the groin (Fig. 2-f).

Alteration of technique.—Should the splint not be available the cardinal principle of management remains the same, first, the overcoming of the posterior displacement of the distal fragment, and, secondly, segmental application of the cast to the injured leg. Should it be impossible to utilize the "well leg" a fracture table may be substituted for extension. The plaster on the injured leg is applied from the toes to mid-thorax, while the assistant pulls anteriorly on the distal transfixion. This is followed by traction in bed with weight and pulley. On the other hand, the pin may be inserted in the ward and the cast applied in segments to the injured leg only, whereupon delayed reduction is obtained by traction supplied by means of a pulley and weight, with the foot of the bed elevated for countertraction, the same as for past methods employed for treating central shaft fractures. Successful results can also be obtained with the tongs, as with wire. However, for the T-fractures, the pin is obligatory.

Intercondylar and T-Fractures

When an intercondylar fracture extends T-shaped into the joint the first requisite is to align the condylar fragments. For this purpose the solid pin is inserted only through that fragment most grossly displaced and alignment proceeds as demonstrated in Fig. 4. For a T-fracture with the condylar sections unduly separated from each other — one displaced medially and the other laterally — the same technique is basically followed. We employ a solid Steinmann pin, 4/32 inch by 10 inches, threaded at each end for utilization with aluminum or steel cylinders, as illustrated in Fig. 5.

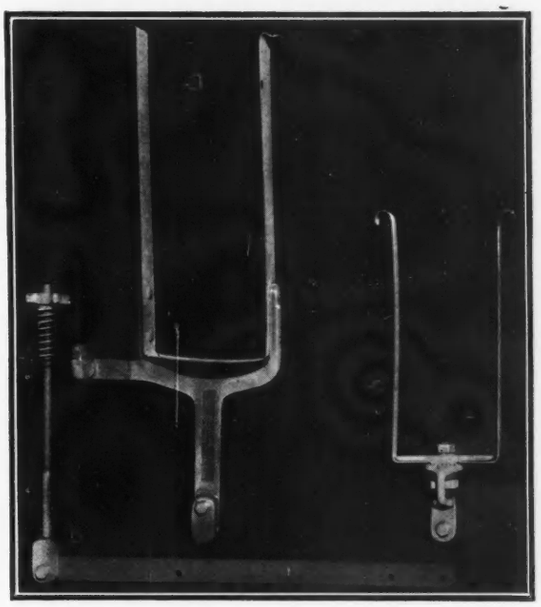


Fig. 3.—Original "well-leg" splint, unbolted into its three major parts; a, countertraction stirrup for "well leg"; b, transverse lever arm; c, traction stirrup for injured leg.

In *malunion*, when open reduction is indicated, the "well-leg" splint performs an important rôle, for the apparatus then acts at the same time as a fracture table and a permanent traction and immobilizing agent. In order to

lessen operative time and shock, the extremity should be immobilized by the application of the splint a day prior to operation. Since a constant, never-varying traction force is maintained, despite moving the patient to bed, there is no danger of graft or reduction slipping after operation.

Compound Fractures

For extensive compound fractures this method lends itself admirably to treating compound wounds as advocated by Orr, the vaseline gauze pack with the occluding plaster-of-Paris cast. Fresh compound wounds of the simpler type are generally treated by non-extensive *débridement* and primary closure with the closest observation, both types of treatment being supplemented by the injection of antitoxin. The majority of compound fractures, including compound T-fractures, can be treated in a manner similar to that described. However, if the wound encroaches upon the usual site of transfixion the insertion of the pin can be altered to suit conditions — at either a higher or lower level in the femur, or through the tibia just below the knee. In the latter event it will be necessary to apply the incorporated pin portion of the cast with the injured knee in flexion. Otherwise, reduction of the posterior displacement is obtained manually, holding the joint's extended position during the application of the cast. In the exceptional compound case where it is advisable to keep the knee of the injured leg in flexion further variations in technique follow, for the cast to the "well leg" must be applied with the knee also in flexion, the countertraction portion of the splint necessarily attached to the thigh section of this "well-leg" cast, while the traction stirrup is likewise attached to the adjacent cast of the injured thigh.

After-Care

For simple transverse fractures or the intercondylar variety, the period of immobilization varies from 5 to 10 weeks, depending upon the formation of callus. Both reduction itself and progress are checked by repeated radiograms. No attempt should be made to dress the insertion wounds from the time the pin or wire is inserted until its removal, at which time no anæsthetic is required as this act is usually painless.

Some Functional Considerations

Reduction is accomplished immediately following trauma, thus adhering to a fundamental principle of fracture treatment — early reduction. The fracture may be reduced and immobilized on the cart upon which the patient entered the hospital. The "well-leg" splint, being an entity in itself, requires neither fracture

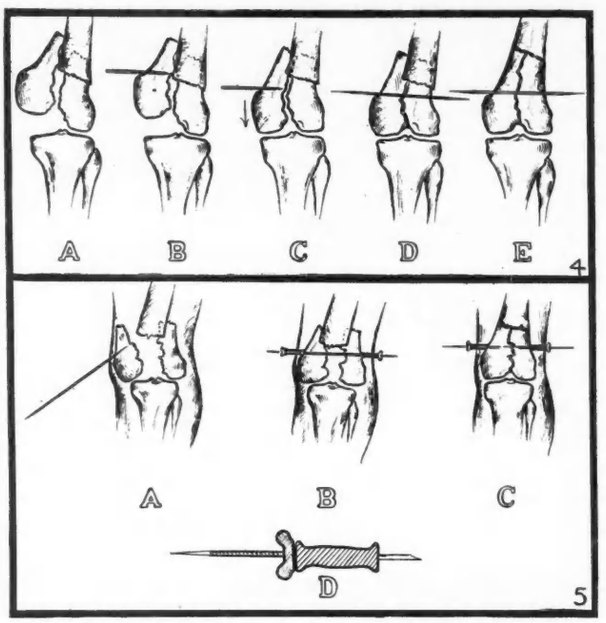


FIG. 4.—Original method of treating T-fractures in the lower end of the femur, when one of the condyles is displaced. A. Note the solid Steinmann pin inserted transversely through the centre of the displaced condyle. B. By employing this pin as a handle the displaced condyle is brought down to the same level as its mate, as in C, where it is nailed in position by forcing the pin through the other condyle; D. reduction is then completed as for a simple transverse fracture, E.

FIG. 5.—Illustrating the method of reduction of supracondylar fractures with an unusual mediolateral separation of the condyles.

A. A threaded Steinmann pin is forced through the centre of that condyle exhibiting the greatest displacement. B. This fragment is brought down until the articulating surfaces are aligned, and then nailed in place by forcing the pin through the opposite condyle. The aluminum sleeves are then slipped over the ends of the pin. By slightly enlarging the pin-wounds the sleeves are forced directly against the cortex of the bone. C. By turning down the thumb-nuts pressure is exerted upon the sleeves until the condyles are approximated. Skiagrams should be taken immediately and if unsatisfactory alignment is revealed a second pin is inserted close to the first pin, solely through the condyle most grossly displaced, whereupon the original pin is drawn out from that condyle, but left in its condylar mate. Since each condyle is now transfixed by separate pins, manipulation can be made individually, after which either pin may be used for nailing the mating condyle into position. The pin with the attached sleeves is incorporated in the first segment of the cast. The transverse fracture is now in readiness for reduction by the same principle illustrated in Figs. 1 and 2. D. An ordinary stainless steel pin threaded and fitted with sleeves and thumb-nuts. These sleeves, made in various lengths, are flared at the ends so that they do not cut in where they contact the cortex of the bone. They may be left incorporated and their wounds not redressed for as many weeks or months as necessary.

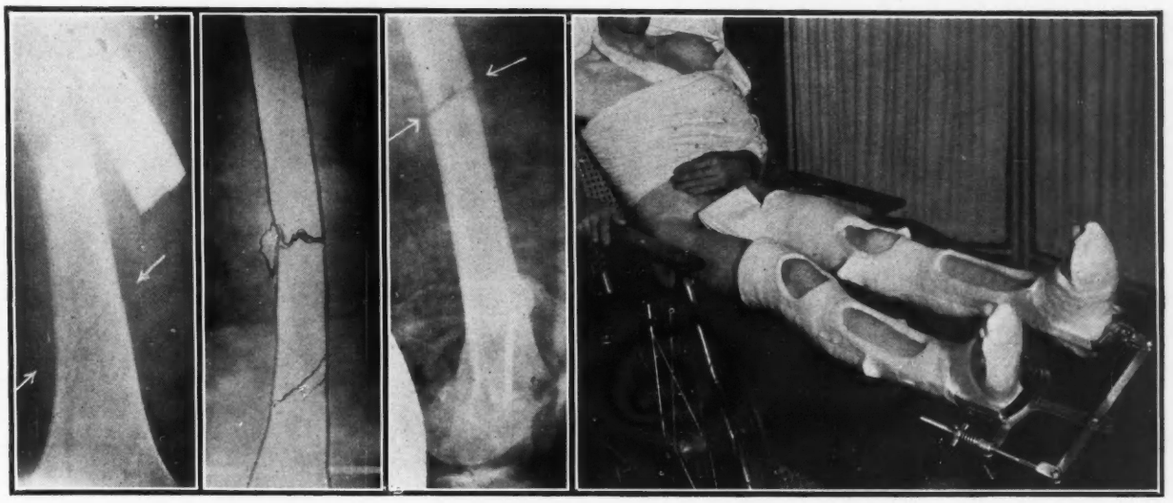


FIG. 6A FIG. 6B FIG. 6C FIG. 7

FIG. 6.—A, x-ray of right femur showing a double fracture with marked displacement of upper or central shaft fracture; B, anteroposterior view, after reduction; C, lateral view, after reduction.

FIG. 7.—The Steinmann pin is inserted through distal end of left femur, at superior edge of the condyles and incorporated in the cast.

table nor weights and pulleys during treatment. Since the "well leg" only is needed for countertraction, the head of the bed is not lowered; on the contrary, it is usually elevated. Elaborate hospital equipment is unnecessary; and as the patient may be moved without danger to the radiographic room, a portable x-ray machine is unnecessary. Further, the patient may safely leave the hospital within a few days after reduction.

This free movement of the patient permits the early use of the wheel-chair, and allows such comfort-accessories as trapeze, bed-table and back-rest. Should the patient be threatened by decubitus he may be turned over on his abdomen, although preferably awaiting the appearance of callus. The patient is not only allowed to sit up but encouraged to do so, treatment especially pertinent for the cardiac-affected, who may sit up day and night without any interference with reduction. With this new method neither age nor size of patient conflicts with the efficacy of the splint, which is made in child and adult sizes and has been used with equal success on patients ranging from a fifteen-month-old infant to a three-hundred-pound adult.

SUMMARY

An easier and more expeditious method has been described for controlling fractures in the distal one-third of the femur, whereby the after-care of these difficult fractures has been reduced to the minimum.

NOTE: Some of the illustrations furnished by the author have had to be omitted for lack of space. They appear in the author's reprint. [ED.]

REFERENCE

1. ANDERSON, R.: New method for treating fractures, utilizing the "well leg" for countertraction, *Surg., Gyn. & Obst.*, 1932, **54**: 207.
2. *Ibid.*: An ambulatory method of treating fractures of the shaft of the femur. (In course of preparation).

SILICOSIS IN PORCELAIN WORKERS.—P. Flemming-Möller considers that the definite diagnosis of silicosis during life can be made only with the help of the x-rays, and that their evidence requires the interpretation of an expert. Even so, it is most difficult in early cases to be certain of the diagnosis. Having made these reservations, he records the findings of an x-ray survey of 798 workers employed in five Danish porcelain factories. He classified his material in eight groups, in the first of which silicosis was definitely not demonstrable, and in the last of which third-stage silicosis was found. In the first two groups, with little or no silicosis, there were 437 workers. In the remaining six groups, representing various stages of silicosis, there were 361 workers. There were only 6 cases of active tuberculosis among these 361, but as many as 43 with hilus shadows indicative of calcified tuberculous glands. The author is inclined to regard the silicosis of porcelain workers as an inhibitive factor in the development of tuberculosis. But among the 437 controls showing no definite x-ray signs of silicosis there were only 3 cases of active tuberculosis, and 65 with hilus glands suggestive of tuberculosis. The two cases of spontaneous pneumothorax in this material reflect, in the author's opinion, a danger which has hitherto been much underrated in the literature. Though emphysema and hypertrophy of the heart were often found associated with advanced silicosis, it was noteworthy how little these workers made of their symptoms.—*Ugeskrift for Laeger*, December 20, 1934, p. 1395.

A CONTRIBUTION TO THE STUDY OF RENAL ANOMALIES

BY PAUL BOURGEOIS,

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THE subject of the anomalies of the urinary "tree", so important nowadays, has for long been almost completely neglected; except for the occasional publication of some extraordinary autopsy finding the only mention of it is to be found in the manuals of pathological anatomy. After thirty years, urological manipulations have been developed and perfected so that diagnosis is easier and the conditions under review have become of clinical importance.

Pyelography, a procedure now the rule in the elucidation of urinary affections, has led to the publication of a great number of extraordinary cases, and has made the classification of these anomalies more and more difficult. However, in 1928, after having made a detailed study of the cases reported up to that time, Edmond Papin,[1] of Paris, in his treatise "The Surgery of the Kidney", laid down the rules for definition and classification which are accepted today.

We are pleased to be able to report here a case of reduplication of the excretory passages from the urological service of Professor Bourgeois at the Notre Dame Hospital.

CASE REPORT

Miss S.B., aged 20, entered the hospital on December 15, 1932. From earliest infancy she had suffered from urinary incontinence. In spite of treatment at various times her infirmity persisted, to such a degree that she was practically ostracized from society.

At about the age of four years she suffered from a severe attack of measles which left her with a complete paralysis of the lower extremities that lasted four or five months. This paralysis, which no longer exists, was, according to the patient, the starting point of her trouble. In 1929, and again in 1931, she was confined to bed on account of renal pain. Menstruation began at the age of twelve and had always been normal. At the present time she soils her clothing freely, both day and night. Nevertheless, she has the normal desire to urinate, and does so with normal frequency. She has never had hæmaturia or pyuria.

Physical examination revealed a patient of medium height, pale and anæmic. Her teeth were poor and her tongue coated. The neck, thorax, limbs, and reflexes were normal.

The abdomen was flat. Deep palpation of the lumbar fossæ revealed a kidney that was depressed, elongated, but insensitive. The left kidney was not palpated. On neither side was ureteral pain elicited. Slight tenderness existed at the level of the left ovarian fossa. The vulva was small and red; the hymen, normal. Rectal examination suggested the presence of a mass in Douglas's pouch, having no connection with the uterus, which organ was normal.

The amount of the urine, apart from that lost by incontinence, varied from 450 to 1,150 c.c. after taking liquids. The urine showed a faint trace of albumin and of urobilin, and rare leucocytes. Uric acid in the blood measured 0.19 g.; blood sugar, 1.10 g.; blood Wassermann test negative. The red blood corpuscles were reduced in numbers and in their hæmoglobin content.

December 27th. Cystoscopy gave the following findings. The urine was clear; no retention; capacity of the bladder, 250 c.c. The bladder was slightly congested, with well marked vessels, and presented a deformity at the left horn, probably caused by pressure of the recto-sigmoid. The trigone was slightly congested; the muscle between the ureteral orifices was not prominent. The right ureteral orifice was punctiform, slightly reddened, admitting easily a No. 13 opaque sound for a distance of 20 cm.; the left looked like a scratch and would not admit a sound higher than 2 cm.

Confronted with this situation, we attempted to perform a retrograde left uretero-pyelography, but failed; the iodide of sodium flowed back into the bladder. We therefore contented ourselves for the time-being with doing an ordinary right pyelography. The radiogram (Fig. 1) showed very clearly a reduplication of the right ureter, which tube, by a lucky chance, we had succeeded in filling up to the level of the junction. We had the picture of a right kidney of increased size, having two well-filled and normal pelves, the ureters descending along the course of the psoas, to unite at the level of the superior inlet, and then, as one ureter, to empty normally into the bladder. On the left side we could not detect any renal shadow nor any trace of the liquid injected.

What were we to think of all this? The fact that we had not been able to catheterize the left ureteral orifice suggested that there might be an abnormal implantation of that ureter, but the absence of a renal shadow in the skiagram, which was a good one, suggested that the left kidney might be lacking. Intravenous urography, practised on December 30th, cleared up the difficulty. Four radiograms made at intervals of 10, 20, 30, and 60 minutes after the injection gave us a good picture of duplication of the right ureter, less marked, however, than with the instrumental pyelography; on the left side, high up beneath the diaphragm, some opaque spots, without telling us anything about the conformation of the kidney or the course of the ureter, gave incontestable proof as to the existence of the left kidney.

During the days following, painstaking examination of the vulva enabled us to prove the discharge of a few drops of urine, increased to a feeble jet by coughing or effort. This urine came from a point between the urethra and the vagina. Having determined this fact, after evacuation of the bladder, by means of the sound and radiography we were able to establish that the incontinence was due to a faulty insertion of the left ureter. Finally, after having tried to catheterize the abnormal meatus with the whole series of filiform bougies, we succeeded in passing a Florence filiform for a distance of 3 to 4 cm. After placing the patient on the pyelography table a soft irrigator, similar to those

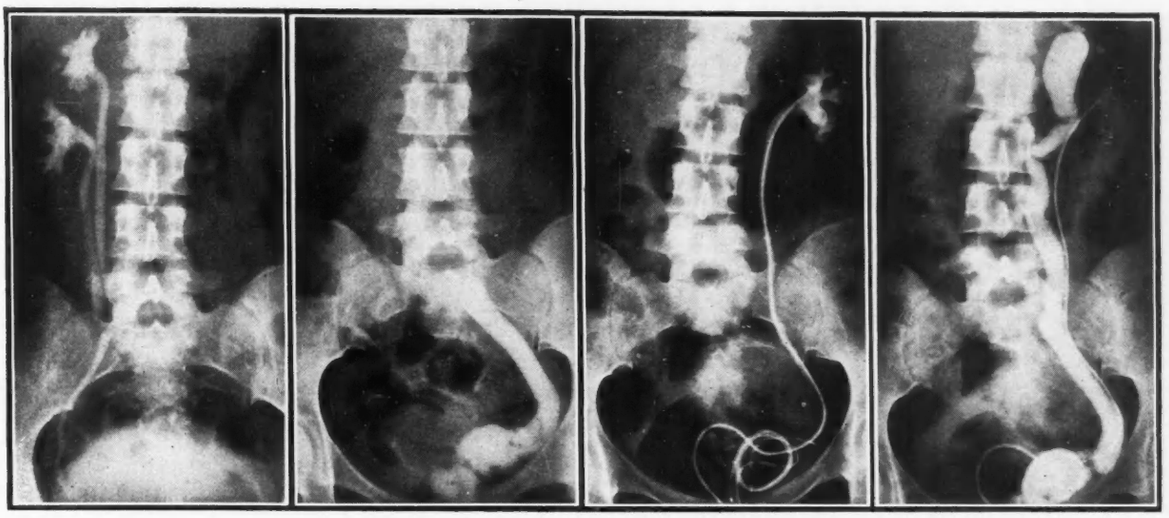

FIG. 1 FIG. 2 FIG. 3 FIG. 4

FIG. 1.—Reduplication of the right ureter; two normal pelves continued by two ureters united into a common tube at the level of the superior strait; no renal shadow on the left side.

FIG. 2.—Ureteral bougie on the left side delimiting the bladder; some traces of iodide in the pelvis. This radiogram was obtained by injecting 25 c.c. of iodide of soda through the anomalous meatus.

FIG. 3.—Pyelogram of the left lower pelvis obtained by objecting iodide of soda by a sound introduced for a distance of 18 cm. through the left ureteral orifice in the bladder. The catheter introduced into the abnormal orifice is curled up.

FIG. 4.—Uretero-pyelogram of the abnormal ureter; dilatations alternating with contractions; the left upper pelvis is dilated and pyonephrotic. The sound is seen in the lower pelvis, which is emptied by the filling of the abnormal ureter.

used for washing out the seminal vesicles, was slipped along the guide, and 25 c.c. of iodide of sodium solution was injected. On this, the patient complained of pain in the left kidney. Radiography (see Fig. 2) brought out the following facts. There was a shadow which presented alternate dilatations and contractions, outlining the left side of the bladder, which shadow reached as high as the kidney pelvis. This latter, which was badly filled, was absolutely shapeless, but gave the impression of being inserted at the upper pole of the kidney, which organ was very imperfectly outlined. It seemed probable, therefore, that there was a second pelvis, situated lower down and discharging by a second ureter into the bladder or elsewhere, and it was desirable that we should try to demonstrate this. A febrile reaction compelled us to delay the necessary investigation for some days.

On February 9, 1933, a second cystoscopy was performed, and, this time, the left ureteral orifice, which had not been catheterized the first time, admitted a No. 13 opaque sound for a distance of 18 cm. A sound of the same calibre was introduced into the vulvar orifice. Pyelography was then tried, with the idea of demonstrating the lower pelvis on the left side corresponding to the vesical orifice. At once a quantity of iodide of sodium in excess of the 25 c.c. injected on the first occasion by the perineal sound, and corresponding to the left upper pelvis, was slowly ejected, meanwhile the patient complaining of pain. Radiograms were then taken stereoscopically, in order to determine the direction of the ureters. Examination of the films (Figs. 3 and 4) gave the following information. First, there was a small lower pelvis on the left side, of normal shape, having three small calyces which were not dilated or deformed. The pelvis was continued by a ureter of normal size and shape, emptying into the bladder at the level of the left angle of the trigone. Secondly, the sound introduced for 18 cm. through the vulvar opening was rolled up like those introduced in the diverticula of the bladder, but the injected fluid reached as high as the kidney and gave the picture of a superior pelvis which was dilated and pyonephrotic, continuous with an enormously dilated ureter which displaced the lower ureter, passed behind it, according to the rule applying to reduplication of the urinary passages, and emptied below at a point more internal and at a lower level.

Examination of the urine from the two sides gave the following:—

Right kidney	*Left kidney*	
	Vesical ureter	Perineal ureter
Negative	Numerous erythrocytes; rare leucocytes; no bacteria.	Many red cells; pus; *B. coli.*
	Concentration of Urea	
7.02 g.	2.85 g.	2.59 g.

We therefore had a very interesting anomaly—right-sided urethral reduplication; reduplication of the urinary passages on the left side, with discharge of the upper ureter in the vulva, the absence of a sphincter at this point explaining the incontinence that was complained of.

The functional integrity of the right kidney being satisfactorily demonstrated we proposed operation to the patient, reserving the right to do a hemi-nephrectomy or a complete nephrectomy on the left side according to the indications that might be revealed.

On February 13th, under ether anæsthesia, we made the usual incision and came upon a kidney of practically normal size, the upper pole of which was rather prominent. Careful liberation of the organ revealed a kidney with two ureters, the upper of which, large and dilated, bore the exact relationship to the lower that the radiogram had depicted. A zone of constriction, separating the upper from the lower part of the kidney, favoured the operation of hemi-nephrectomy. A wedge-shaped excision, encroaching on the healthy tissue of the lower half, enabled us to take away easily that portion of the kidney corresponding to the upper ureter, and with an insignificant amount of oozing. The ureter was divided by the galvano-cautery between two ligatures at the level of the upper isthmus; a main renal artery was seized and a piece cut out and removed. The area of defect was completely closed in with catgut sutures, and

four ligatures controlled the hæmorrhage. The stump of the kidney was fixed by its capsule to the sacro-lumbar structures. The wound was closed in two layers with No. 3 catgut. A cigarette drain was placed at the level of the anchoring suture and a tubular drain at the bottom of the renal bed.

The course of events after operation was normal. The oozing from the vulva diminished considerably on the first day, and eventually dried up completely. On the fourth day the cigarette drain was removed. On the tenth day the tubular drain and the sutures were removed. A slight degree of suppuration persisted, which, however, disappeared by the sixteenth day. The amount of urine for twenty-four hours, which was 200 c.c. on the first day after the operation, rose to 900 c.c. the day after, and to 1,900 on the third day. The patient got up on the twentieth day and was discharged on March 11, 1933.

She has been seen at various times since and is quite well. The incontinence has disappeared; she has put on flesh; she dresses like everybody else and is very happy.

Renal anomalies have been divided into nine groups: anomalies of number, size, form and position; symphyses; reduplication of the urinary passages; anomalies of the pelvis and of the vessels; and, unclassified forms.

Anomalies of number (total defect of the kidneys) are incompatible with life and present no practical interest. Under the term "solitary kidney" one of the kidneys is lacking, anatomically and embryologically; unilateral renal atrophy represents a physiological defect. An extremely rare anomaly is accessory kidneys, where one or more parenchymatous masses exist, which possess their own ureters discharging into the bladder or elsewhere.

Anomalies of size.—Among these may be included cases of hypoplasia, in which the atrophy is congenital and not related to an organic lesion. Here, examination of the kidney will show a notable diminution in the number of the pyramids, or a normal structure, but of small size.

In congenital hypertrophy there is an increase in the number of the pyramids, the lobules, and the urinary tubules; this increase, partial or complete, may affect one pole or the complete organ.

Anomalies of form include the "discoid kidney", the result of a defect in the rotation of the organ during intra-uterine life, and the "constricted kidney", which shows a tendency to division into two secondary masses, the first stage in the direction of reduplication.

Anomalies of position.—Dystopia of the kidneys is of great practical interest from the surgical point of view.

In the course of embryological development, during its movement towards the lumbar region the kidney rotates on its axis, so that the hilus, which originally presented at the ventral aspect and was somewhat expansive, comes to look inwards and to be more constricted. Three types may here be included — diminution and exaggeration of rotation, and faults in rotation.

Where rotation has been insufficient the kidneys are situated low down, are flattened, with a broad posterior surface corresponding normally to the external aspect and an anterior surface corresponding to the internal aspect. The vessels, necessarily, must cross half of the anterior surface and the ureter depends from this surface also.

When rotation has been excessive the anterior surface is smooth, flattened, and the hilus is at the back. The vessels cross half of the posterior surface and the ureter depends from this side.

With faulty rotation we get an inverse position of things. The convex border faces the median line and the pelvis faces inwards. The vessels pass in front of the kidney to reach the hilus.

The distinction between *congenital* and *acquired* renal ectopia is not always easy, but we can apprehend somewhat the characters of the congenital form. In shape the kidney is somewhat flattened and it is situated generally at the crest of the ilium; the vessels are not elongated and are inserted lower than normal into the aorta and vena cava; the hilus is found on the anterior surface and the ureter is usually short. According to the height of the kidney ectopia will be lumbar (high or low), iliac, or pelvic. It will be *simple,* if the kidney is situated on the proper side; *transposed,* if situated on the same side as its fellow; *unilateral* or *bilateral* according as to whether one or both kidneys are involved.

Symphysis, or fusion, is the condition in which the two kidneys are united by their poles or edges, and this can be either median or lateral. The best known form is the so-called "horseshoe kidney", in which two symmetrical kidneys are united by their similar poles and are situated in front of the vertebral column. Under this category we include the L-shaped kidney, in which two asymmetrical parts possess a sinus directed right or left. According to the position of the union, whether at the lower poles (the common form) or at the upper (rarer) we get horseshoe kidneys with the concavity above or below, respectively. Another form of symphysis

is the "cake-like kidney", formed by intimate fusion, in which the two kidneys are represented by a nodular mass situated in front of the vertebral column or the sacrum. In this case the mass is shapeless, so far as the contour of the constituent organs is concerned, and the line of fusion cannot be determined. The pelves present anteriorly and are composed of the ureters which empty in their usual situation; the vessels are numerous and of large size, both in course and origin. The "sigmoid kidney" exhibits a form of symphysis in which the two organs are united by their dissimilar poles, in this quite unlike what pertains in the case of the horse-shoe kidney. Unilateral renal symphysis is produced in the majority of cases by the fusion, in a vertical direction, of the kidneys on the same side of the vertebral column. The ureters discharge into the bladder in the normal way, the upper springing from the side of the mass. It is these characteristics which distinguish this condition from congenital reduplication of the ureters, in which the two ureters open side by side into the bladder.

Reduplication of the urinary passages presents quite a variety of forms. For the sake of simplicity it will suffice to divide these into two groups — double ureters and bifid ureters. The name "double ureter" is given to ureters which, arising from two separate pelves and always superimposed in the vertical axis, come, without uniting, to discharge by two orifices at a line prolonging the trigone of the bladder. Accordto a well-known law, the upper ureter follows the course of its fellow, but empties into the bladder at a point lower and more internal than it does. The name "bifid ureter" is reserved for those cases in which two ureters unite somewhere above the level of the bladder and discharge into that viscus by a single opening. These anomalies can be uni- or bi-lateral, and it may also happen that one of the two branches may be impermeable, not corresponding to any portion of the kidney substance.

Anomalies of the pelvis properly include only the large pelvis found in congenital hydronephrosis, the "ramified" or "ampullary" varieties being usually regarded as normal.

Anomalies of the blood vessels are more frequent and very complicated. The variations in their origin, division, course, insertion, collateral distribution, and number would afford material for a voluminous disquisition. A surgeon who is on the alert for these will suspect their presence when in the course of lumbar section he finds difficulty in the exteriorization of the kidney, and prudence will suggest to him the advisability of dividing between sutures the bands so often met with.

Under *unclassified anomalies* are included those which cannot be included in any of the groups mentioned above, as, for example, two kidneys with only one ureter.

How should he classify the case reported in this communication? The theoretical considerations dealt with above negative completely the idea of supernumerary kidney. It is true that the outline of a groove which was very noticeable at the upper pole favours this assumption, but the fact that the two ureters discharged below on the same side of the median line, and, what is more, that the laboratory tests showed a practically identical concentration of the urine in the two cases (2.85 g. for the upper ureter, and 2.52 g. for the lower) allows us to conclude that there was a left kidney with two ureters.

This condition of a bifid ureter on one side, with reduplication on the other, is rare enough, since Papin,[1] in 1928, was able to collect only 14 cases. Moreover, the abnormal (extravesical) insertion of one of the two ureters is still rarer, as we have been able to discover only 6 cases including our own. Since our patient had suffered from incontinence since she was four years old we must, perforce, conclude that the affection was congenital.

As in most of the cases where abnormal ureters discharge at the vulva or into the vagina, our patient manifested infection, and it is this infection which must be held responsible for the renal "crises" from which she suffered in previous years. The incontinence of urine, rebellious to all forms of treatment, unaffected by the onset of puberty, constant day and night, and accompanied by normal episodes of micturition, should have suggested the existence of an anomaly of the urinary apparatus, and careful exploration would have established the diagnosis.

The technique which we employed in this case was that of our teacher, Doctor Papin. Wherever possible, treatment should be conservative. The simplicity of the operative pro-

cedure and the result obtained have been quite satisfactory, and we feel sure that the portion of kidney that remains will improve in function.

We have presented this case in order to show that what is commonly called "incontinence" may be due to an essential vitium of development which is amenable to surgical control.

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CARCINOMA OF THE SMALL INTESTINE*

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IN a previous article the writer dealt with the subject of sarcoma of the intestine. In this paper it is proposed to continue the discussion of malignant tumours of the bowel, confining it to true primary carcinomata of the small intestine.

In reviewing the literature one finds that frequently, and even recently, discussions of carcinoma of the small intestine have included carcinoids and other tumours. For this reason it is difficult, if not impossible, to give accurate figures regarding the incidence of true carcinomata of the small intestine. That they are uncommon, however, is generally conceded. Ewing[4] estimates that they comprise about 3 per cent of all intestinal carcinomata, and Brill, about 2.5 per cent. In the Montreal General Hospital the figure is considerably lower. In a series of over 600 cases of intestinal carcinomata admitted during the past twenty-eight years, only 7 true carcinomata of the small intestine have been found. This is slightly over 1 per cent of all intestinal carcinomata. During the same period a number of carcinoids of the small intestine have been recorded, many of which were casual autopsy findings, and one case of primary carcinoma of the ampulla of Vater. Confirming our experience, Lynch,[8] after reviewing the literature in 1933, concludes that the incidence as stated by Ewing and others is much too high. Kiefer and Lahey[6] point out that these tumours are slightly more common than sarcomata. This also agrees with our statistics.

The age incidence of primary carcinoma of the small intestine is similar to that of carcinoma in general. The average age is stated by Rolleston and by Clark[3] to be 46 years. The earliest age reported was 3½ years (Duncan), while Primrose[12] found a case in a man 80 years of age. Carcinoma is more common in males than in females, in the proportion of 2 to 1. In our series there were, however, three males and four females; the average age was 45.8 years.

SYMPTOMS

Clinically, these tumours fall roughly into two groups, those with symptoms of acute and those with symptoms of chronic obstruction. Generally speaking, the symptoms will be characteristic of either group, or of a combination of both. The detailed symptoms, however, will vary with the location, size and character of the tumour. Consequently, there is no typical clinical history. In the cases resulting in chronic obstruction the earliest symptoms usually are vague abdominal discomfort, most frequently in the umbilical region, accompanied by indigestion, increasing constipation, eructations of gas, and gradual loss of appetite, weight and strength. After a varying length of time the discomfort changes to definite pain of a colicky type, and gradually increases in frequency and severity. With this development, all other symptoms are exaggerated and vomiting may develop, especially if the tumour is situated in the proximal portion of the jejunum or duodenum. There may be some distension. Constipation may alternate with diarrhœa. Melæna and hæmatemesis are both rare, but occult blood in the stools may be demonstrated early in the disease. Cachexia may become very marked. Symptoms of acute obstruction may supervene at any time.

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These symptoms are too well known to bear repetition.

The rule holds in these cases, as in other forms of obstruction, that the more proximal the lesion, the more acute and severe the symptoms. It may be mentioned here that occasionally intussusception may have been brought on by the rare polypoid types of primary carcinoma.

DIAGNOSIS

The diagnosis of carcinoma is rarely made prior to operation, even when it has been possible to make an x-ray examination after an opaque meal. In chronic cases numerous other conditions must be considered in the differential diagnosis, and these only serve to make an exact diagnosis more difficult. Among the principal conditions to be excluded are,— (1) peptic ulcer, (2) gall bladder disease, (3) chronic appendicitis, (4) functional gastro-intestinal disorders, (5) diseases or tumours of the large intestine, (6) inflammatory adhesions and developmental bands, (7) intestinal tuberculosis. Other rarer possibilities are (1) Meckel's diverticulum, (2) internal herniæ, (3) obstruction by the superior mesenteric vein, (4) sarcomata and rare tumours. In our series of seven cases, two were admitted with acute obstructive symptoms, and one other might be grouped with these, though the attack had subsided before he entered the hospital. The remainder all had symptoms of chronic obstruction.

CLASSIFICATION

There is no uniformity in the many classifications that have been suggested for these tumours. Most of the classifications suggested include carcinoids and other tumours that are not carcinoma. Excluding these, the majority of primary carcinomas of the small intestine have been found to be adenocarcinomata, usually of the annular stenosing variety. This is in marked contrast to the longitudinal growth of the sarcomata, which show little tendency to stenose the lumen of the bowel. Occasionally, polypoid carcinomata have been found, usually in conjunction with a local or general polyposis. These tumours at times have led to intussusception.

SITE

The site of carcinoma of the small intestine is most frequently toward either end of the small intestine, that is, in either the proximal jejunum or the distal ileum. The duodenum is less frequently involved, and most rarely of all the middle portion of the small intestine. In fact, this latter area has been looked upon as enjoying a comparative immunity from carcinoma. In our series of 7 cases, 3 were in the distal third of the ileum, 2 in the proximal jejunum, 1 in the middle portion of the small intestine, and in 1 case the site is not recorded. There were a few cases of carcinoma in the region of the ampulla of Vater, but it has not been considered advisable to include any of these in this series, as their exact origin could not be determined.

PATHOLOGY

All degrees of malignancy according to Broder's classification have been met with. Necrosis, ulceration and various forms of degeneration, as colloid and mucoid, are quite common. Perforation has occurred not infrequently and is often followed by peritonitis. Metastases may occur in remote situations, such as bone, lungs, liver, etc., as well as locally in lymph nodes and mesentery. All 7 of our series were adenocarcinomata of the constricting type. Six of them showed metastases in the regional lymph nodes or mesentery. Ulceration in varying degrees was present in 4. Extensive mucoid degeneration and necrosis was found in 1, and local areas of ulceration and necrosis in 2. Perforation of the bowel had occurred in 2 of our series, but in both instances this had been walled off by adhesions to the adjacent bowel or mesentery. In one of these cases a perforation had also occurred between the terminal ileum and cæcum, near the ileo-cæcal valve. In the Department of Pathology of the Montreal General Hospital, the so-called carcinoids of the small intestine have, for quite a long time, been regarded as a special kind of tumour and have not been classed with the carcinomata. Masson,[9] in a recent article, has demonstrated very clearly that these tumours, which were first described by Lubarsch in 1888, originate from the argentophile cells of Kultschitzsky in the crypts of Lieberkuhn, and have an intimate connection with the autonomic nervous system. They may, at times, contain large numbers of nerve fibres and are then called neuro-carcinoids. They do not resemble true carcinomata, either grossly or microscopically, and they seldom metastasize.

Many of them are very small and only accidental findings. The larger ones, however, may bulge into the lumen of the bowel and cause symptoms, and, as in one of our cases, may produce obstruction. Occasionally, carcinoids are multiple. The separation, in this hospital, of these tumours from the true carcinomata is responsible for the low percentage of true carcinomata of the small intestine in our records.

TREATMENT

In discussing the treatment of primary carcinoma of the small intestine one point should be stressed. Given a history of partial chronic obstruction of the small intestine which cannot be satisfactorily explained, carcinoma should be considered and an exploratory laparotomy performed. Mortality statistics in all forms of carcinomata emphasize the importance of early and radical operation. Treatment of the cases resulting in acute obstruction needs little discussion beyond emphasizing the necessity for regarding relief of the obstruction as the prime consideration.

PROGNOSIS

The prognosis in carcinoma of the small bowel is, in general, not so good as that of carcinomata of the bowel elsewhere. The more proximal the tumour, the poorer the outlook. Six of our series are known to have died, while the fate of the seventh is not known.

Following are the records of seven cases of carcinoma of the small intestine, which occurred in the Montreal General Hospital between the years 1906 and 1934. They are given in detail in order that a general picture of the clinical signs and symptoms may be presented.

CASE 1

(M.G.H. No. S-07-1180). J.P., a female, aged 43, had been under the care of several physicians for a number of months, suffering from stomach trouble of an undetermined character. She had had an intermittent colicky abdominal pain and at times noticed a swelling near her umbilicus. She was finally seen by Dr. H. A. Lafleur. The patient stated that she had lost some weight since the onset of symptoms. She remained under observation for a short time, when she developed severe abdominal colic, with nausea and vomiting. After a few hours the vomiting became of a fæcal character, and she collapsed and was admitted to the hospital by ambulance.

On admission she had a temperature of 101°, a running pulse of 128, and was in a state of marked collapse. The abdomen moved freely with respiration and was not distended. There was no splinting of the muscles, and only slight general tenderness. No masses were felt, nor was there any dullness to percussion. There was, however, evident visible peristalsis in the left iliac region. Four hours after the onset of the fæcal vomiting, a diagnosis of intestinal obstruction was made and she was operated on by Dr. G. Armstrong.

A median line incision below the umbilicus was made under local anæsthesia. On opening the abdomen a distended small bowel protruded. The site of obstruction was located low down in the pelvis on the left side. The small bowel was involved and this was liberated and brought into the wound. The area of obstruction was confined to one area which looked as if a "whip-cord" had been tied around it. This area was clamped above and below, and a lateral anastomosis done. The mesenteric glands did not appear to be enlarged. The patient failed to rally after the operation and died the same day.

Pathological examination (No. A-07-183).—The resected portion of bowel contained a narrow constricting tumour which almost occluded the lumen. On microscopic examination this was demonstrated to be a typical adenocarcinoma. No glandular metastases could be made out.

CASE 2

(M.G.H. No. S-07-787). K.deP., a female, aged 56, gave the following history. About 9 months previous to her admission she had a sudden attack of severe colicky abdominal pain in the pit of the stomach, followed by nausea and vomiting. The attack passed off after a few hours and she felt well the next day. Three weeks later she had a similar attack of pain which continued at similar intervals for the next three months. Then the attacks gradually became more frequent so that during the last two months they occurred two to three times a week. The patient had always been constipated, but this condition became worse with the onset of the attacks. There was never any blood or mucus in the stools. The patient's weight fell from 130 to 90 lbs.

Examination on admission showed a moderate degree of emaciation and anæmia. The patient was slightly irrational at times, with morbid ideas. There was a moderate degree of general arteriosclerosis. The abdomen moved freely with respiration. There was neither tenderness nor splinting, but an "egg-sized" tumour was felt in the lower right quadrant. The heart and lungs showed no abnormality, and the urine was negative.

Operation.—A mid-line sub-umbilical incision was made. On opening the abdomen and examining the intestines a small hard mass was found in the mid portion of the small bowel. This mass — a tumour in the intestinal wall — had lead to an annular constriction about 1 inch in width. Proximal to this the bowel was dilated and the wall thickened for some distance. No glandular enlargements were noted. A resection and lateral anastomosis was done. Post-operative recovery was uneventful and the patient left the hospital in four weeks. She had had some persistent diarrhœa after her operation, and she died at home within a week of leaving the hospital. An autopsy was done at her home.

Pathological examination (No. A-07-145 and No. S-07-238).—Examination showed the lateral anastomosis to be quite patent. In the surrounding mucosa a number of recent ulcers were found. No organic metastases were found, but the regional lymph nodes were enlarged. Microscopic examination of the surgical specimen showed a typical adenocarcinoma of the ileum, with metastases in the regional lymph nodes.

CASE 3

(M.G.H. No. S-09-26). R.S., a female, aged 46, had complained for two months of colicky abdominal pain after meals. She stated that they had been mild at first but had gradually grown worse. She felt as though something were trying to pass along the bowel but could not. At times the pains were accompanied by marked borborygmi and considerable belching of gas. Her appetite had fallen off, and she was at times afraid to eat for fear of pain. The bowels had become very con-

stipated. There was no history of blood in the stools, nor was there any nausea or vomiting. There was some loss of weight.

Examination showed a poorly nourished woman, somewhat anæmic. The abdomen did not move with respiration, and was tympanitic throughout. In the left side, at the level of the umbilicus, a small hard mass could be felt. It was about "the size of a walnut", slightly tender and movable.

Operation.—A left trans-rectus incision was made at the level of the umbilicus. On opening the abdomen there was a ring-like constriction in the distal third of the ileum. So tight was the constriction that the lumen of the bowel would scarcely admit the tip of a lead pencil. In the mesentery opposite this constriction a large mass of enlarged and matted lymph nodes was felt. The bowel proximal to the constriction was dilated and œdematous. Resection of the constricted bowel and a lateral anastomosis were done. No attempt was made to deal with the glandular mass. Post-operative recovery was uneventful and after leaving the hospital x-ray treatments were carried out.

Pathological examination (No. S-09-340).—Examination of the resected portion of the small intestine showed an annular constricting tumour which had almost occluded the lumen. The lymph nodes in the adjacent mesentery were enlarged, hard, and matted together by adhesions. Microscopic examination showed a typical adenocarcinoma, with extensive metastases in the regional lymph nodes.

A year later the patient returned to the hospital, having developed recurrent severe colicky abdominal pain with some nausea and occasional vomiting. She had lost 10 lbs. in these months. Examination showed a large tumour mass in the left lower quadrant. An exploratory laparotomy showed a large growth in the small bowel near the previous anastomosis, with metastases in the mesentery, omentum and broad ligament. There was such marked matting together of the intestines that no anastomosis was attempted. The wound was closed and subsequently healed. The patient was discharged in a hopeless condition and subsequently died at her home.

CASE 4

(M.G.H. No. S-11-490).—H.H., a male, aged 61, was admitted with symptoms of acute intestinal obstruction of a few hours' duration. Examination showed a patient in moderate shock. The abdomen was distended and did not move with respiration. It was moderately tender and there was splinting throughout. No masses were felt.

Operation revealed an annular constricting tumour in the lower third of the small intestine, which had greatly narrowed the lumen of the bowel. The intestine proximal to the constriction was greatly dilated, congested and œdematous, while distally the bowel was collapsed. Resection and lateral anastomosis was done. Post-operative recovery was stormy, but the patient left the hospital in good condition. There were no subsequent follow-up records of the case.

Pathological examination (No. S-11-490).—The specimen consisted of a portion of small intestine involved by a tumour mass which narrowed the lumen so that it was the size of a "goose quill". The mass surrounded the lumen completely and was very firm. Microscopic examination showed a typical adenocarcinoma of the small intestine, with no evident metastases in the regional lymph nodes.

CASE 5

(M.G.H. No. S-28-7458). R.P., a female, aged 26 years, had had occasional attacks of colicky abdominal pain for a year. The pain, which was in the upper abdomen, usually passed off in a few hours without vomiting or nausea. For twenty-four hours previous to admission the colicky pain had been persistent and was accompanied by nausea and retching. The pain had shown a tendency to abate just before her admission.

Examination showed a fairly well nourished female. The abdomen moved with respiration, and there was no rigidity, tenderness or dullness. No masses could be felt. The heart and lungs were negative. Urinalysis, negative. White cells, 6,000. A barium series was carried out. The stomach was large, dilated and atonic. The duodenum was somewhat dilated. The six-hour plate showed 75 per cent gastric retention, while the duodenum and the first part of the jejunum was dilated. The head of the meal had reached the ascending colon. The findings suggested some obstruction of the jejunum close to the duodeno-jejunal flexure, the exact nature of which was impossible to determine.

Operation was carried out through a right rectus incision. On opening the peritoneal cavity the stomach and duodenum were found to be greatly dilated. In the jejunum just beyond the ligament of Treitz there was a hard annular mass constricting the bowel and showing an area of ulceration on its peritoneal surface. A resection of the mass was done removing the adjacent segment of mesentery. Owing to the mass being close to the duodeno-jejunal flexure only a short proximal stump of bowel remained and an end-to-end anastomosis was done. Post-operative recovery was uneventful.

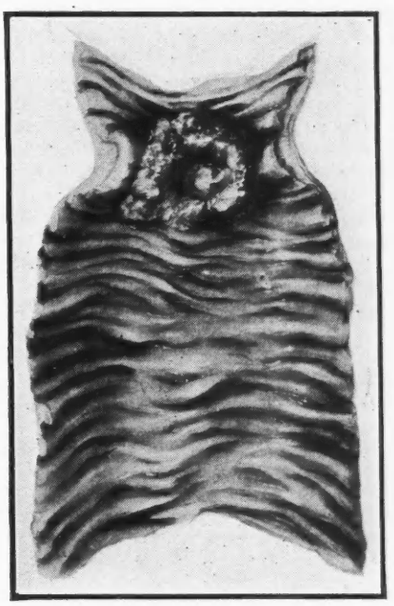

FIG. 1.—*Case 5.* Photograph of a drawing of the resected portion of jejunum showing the annular constriction of the lumen caused by the tumour. The proximity of the excision line on one side of the tumour was made necessary by its nearness to the duodeno-jejunal flexure.

Pathological examination (No. S-29-4).—The specimen consisted of a portion of small intestine, 10 cm. in length. Near one extremity was an encircling hard mass, 2.5 cm. wide. This mass infringed upon the lumen, narrowing it to 4.5 cm. Immediately proximal to it the circumference of the intestine was 7 cm. The serosa opposite the indurated mass showed a depressed circular ulcer, 1.5 by 0.5 cm. which involved the proximal half of the circumference of the intestine. In the mesentery opposite the tumour a small area of induration was palpable. The mucosa was almost completely wanting over the tumour area. On section the tumour area varied from 0.5 to 1.2 cm. in thickness, and was pale, very hard and showed ulceration. It was intimately attached to the surrounding intestinal wall. The muscular coats proximal to the constricting tumour was greatly hyper-

trophied; the proximal margin of the growth was within 1.5 cm. of the line of excision.

Microscopic examination showed a typical adenocarcinoma with quite extensive metastatic deposits in the regional lymph nodes.

This patient was re-admitted in August, 1929, with recurrent symptoms of partial intestinal obstruction of several weeks' duration, and marked loss of weight. A large mass was felt in the left lower quadrant, extending down into the pelvis. There was no tenderness or splinting, and no fluid in the peritoneal cavity. A barium series showed a slight delay in the jejunum and an x-ray of the vertebral column was negative. The diagnosis of recurrent carcinoma was made, and the condition was considered inoperable. X-ray treatment was carried out, and for a time this seemed to bring about some improvement, but the patient finally succumbed to toxæmia and inanition.

CASE 6

(M.G.H. No. S-33-565). K.H., a male, aged 33 years, was admitted with a history that about three weeks prior to admission he was suddenly seized with a severe attack of generalized abdominal colicky pain. He did not vomit, but the pain persisted and he was confined to bed for the next ten days. During this time his appetite was very poor and his bowels very constipated. The pain then gradually subsided, but left a dull ache in the right lower quadrant. A diagnosis of acute appendicitis was made.

Examination showed a well developed and fairly well nourished white male. The abdomen moved freely on respiration. There was definite localized tenderness in the right lower quadrant and slight splinting of the right rectus muscle, but no rebound pain. On deep palpation there was a tender mass at the level of and just to the right of the umbilicus which was thought to be a perforated appendix wrapped in omentum. The general examination apart from the above was negative.

At operation the mass which had been palpated was found to be a tumour of the jejunum, about 30 cm. from the duodeno-jejunal flexure. This involved the whole circumference of the bowel and almost occluded its lumen. It also extended into the mesentery to its root, involving the regional lymph nodes. Owing to the proximity of this extension to the mesenteric artery, it was found impossible to do a complete excision of the tumour. About one metre of jejunum containing the tumour and as much as possible of the mesentery were resected, and an end-to-end anastomosis done. No evidence of metastases could be found in the liver or any other organ.

Pathological examination (No. S-33-175).—The specimen consisted of 18 cm. of the jejunum in the centre of which was a constricting tumour measuring 7 x 6 cm. and 4.5 cm. in thickness. It was pale and the mucosal surface was ulcerated and its borders heaped up. The peritoneum overlying was intact. In the adjoining mesentery there was one enlarged lymph node. Microscopic examination showed a typical adenocarcinoma extending through all the coats of the intestine excepting the serosa. Mitotic figures were abundant.

The patient made a good recovery from the operation. The wound became slightly infected. This rapidly subsided. He left the hospital in good condition, but within six months died from metastases.

CASE 7

(M.G.H. No. S-33-6191). J.N., a male, aged 58 years, had for almost a year lost strength, weight and appetite. Three months before his admission he took a vacation but this failed to improve his condition. He then consulted a physician who found his abdomen was tender and also that he had glycosuria. Under observation he developed obstinate constipation and finally was forced to resort to enemata for relief. On at least two occasions bright blood was noted in his stools. A barium enema, done in another hospital, showed a tumour in the ileo-cæcal region. It is interesting to note that this man had, for some time, had a periodic medical examination, but beyond the persistent finding of slight glycosuria for which he had undergone dietary treatment, nothing was found. His mother and father had both died of diabetes.

Examination showed a moderate amount of wasting and anæmia. The abdomen was slightly distended, but moved freely and symmetrically with respiration. The right lower quadrant felt slightly more distended than it did elsewhere, but no definite masses could be made out. The liver and spleen were not enlarged. Rectal examination was negative. General examination showed nothing of importance. Examination by the Department of Metabolism confirmed the presence of a mild chronic progressive diabetes. He was prepared for operation by the use of diet and insulin.

At operation a large mass, which was considered malignant was found involving the terminal ileum and the cæcum. A resection was done of 30 cm. of the terminal ileum, together with the cæcum, ascending colon and a portion of the transverse colon. The retroperitoneal space was carefully examined for lymph nodes, but none were found. The posterior peritoneum was then closed and a lateral anastomosis between the stumps of the terminal ileum and colon was done.

Pathological examination (No. S-33-1932). — The specimen consisted of 31 cm. of the terminal ileum and 56 cm. of the ascending and transverse colons, with attached mesentery and omentum. The ileo-cæcal junction was involved in a firm irregular mass, with resulting deformity. On opening the bowel, the above mass was found to involve chiefly the circumference of the lower end of the ileum. It had also extended into and involved the posterior wall of the cæcum throughout an area 9 cm. wide. The normal ileo-cæcal orifice was intact and uninvolved, but the tumour had extended through the walls of the cæcum and terminal ileum and into the mesentery. The mesentery bordering the more proximal portion of the ileum was intimately involved in the local extension of the tumour. This had resulted from the growth destroying a large part of the tissues that normally separate the lumen of the ileum from the cæcum.

Microscopic examination showed a typical adenocarcinoma involving all coats of the cæcum and ileum to a greater or lesser degree. There were scattered areas of mucoid degeneration and extensive areas of necrosis, as well as superficial ulceration, on both mucosal and serosal surfaces of the bowel.

Post-operatively, the patient developed a severe diarrhœa, a fæcal fistula, and persistent hiccough. In spite of blood transfusions and supporting treatment he died eight days after operation.

An autopsy, (No. A-33-226), was done which showed that the anastomosis had broken down, resulting in generalized peritonitis. There was also a bilateral terminal broncho-pneumonia. The pancreas showed extensive sclerosis of the islets of Langerhans. There was also marked arteriosclerosis of the aorta and kidneys.

SUMMARY

The subject of carcinoma of the intestine is discussed, and the literature reviewed and brought up to date. In addition 7 cases which have occurred at the Montreal General Hospital are reported.

I am indebted to various members of the Surgical Staff of the Montreal General Hospital for permission to include their cases in this paper.

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INFECTION OF THE MOUTH IN RELATION TO DYSENTERY, WITH REPORT OF A CASE OF INTESTINAL AMŒBIASIS

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WHILE studying the relation between intestinal amœbiasis and mouth infection in the tropics, I published a short report[1] in 1923, regarding a considerable number of patients who had amœbic dysentery and at the same time suffered from pyorrhœa alveolaris. In these patients amœbæ closely resembling the *Entamœba histolytica* were abundant in the diseased pockets of the gums. Though such amœbæ were found in the mouth in a large percentage of the cases of intestinal amœbiasis, we were unable to ascertain whether the infection of the intestinal tract preceded the mouth infection or *vice versa.* It was noteworthy that encysted amœbæ were found in the stools of a number of patients with pyorrhœa alveolaris who showed no clinical symptoms of amœbiasis, suggesting that the condition, though actually existing, may be ignored by the patient.

With the invaluable assistance and interest of Doctor Delgado, Dental Surgeon, of Cartagena, Colombia, during the years 1923 to 1925, I had the opportunity of studying a large number of different infections of the mouth, especially pyorrhœa alveolaris. All the cases of pyorrhœa studied presented amœbæ in the pockets of the gums, and in 50 per cent the amœbæ closely resembled the *Entamœba histolytica,* both in fresh and in stained preparations. Stools were examined from all these patients and in 75 per cent encysted amœbæ were found. Even though at the time of observation no intestinal disturbance was complained of, the patients were known to have suffered before or had suffered later from amœbic dysentery.

Cats fed with cultures of *Amœba gingivalis* presented an attenuated form of dysentery. The amœbæ isolated from the stools of the cats resembled closely the *Entamœba histolytica.* The intestines, of 2 out of the 20 cats in the experiment, showed lesions typical of those produced by the *Entamœba histolytica.* One of our staff drank some water containing a culture of *Amœbæ gingivalis,* in order to observe the pathological effect, if any, that the amœbæ may produce in the human intestine. Four weeks after she took the culture she started to complain of dysentery, but not so severe as we were accustomed to see in the histolytica type. Except bismuth nothing was given, as we were interested in producing a chronic infection. The dysentery disappeared for a period of six months, but encysted amœbæ were continuously found in the stools. After several recurrences, the dysentery became so severe that the patient was forced to receive active treatment, after which it cleared up. Two years later, however, she was operated on for an amœbic abscess of the liver, and almost paid with her life for this experiment.

Should we consider *Amœba gingivalis* a pre-

liminary form of *Entamœba histolytica*, only modified morphologically by the environment? Is amœbiasis of the mouth a predisposing factor of intestinal amœbiasis, as deRivas[2] and others have suggested? In this country, where parasitic intestinal infections are not so common and not so complicated by other protozoa and metazoa, it might be of interest to study the relationship of these infections. For this reason, I am reporting a case that came to my observation, believing that in this patient the infection of the mouth preceded the amœbic intestinal condition.

CASE REPORT

A young married woman of 32 gave a history of having suffered from an infection of the gums for many years. Off and on she had been treated for sore gums and loose teeth. Except for slight occasional gastro-intestinal disturbances she did not complain until December, 1933, when she began to suffer from frequent bowel movements. She was then in the first few months of pregnancy, and attributed the dysentery to her condition. As she continued to feel worse and to complain of abdominal cramps and severe diarrhœa with bloody mucoid stools, her physician sent her to the hospital for observation, where a diagnosis of amœbiasis was made. She was given 14 injections of emetine, and as the condition cleared up she was considered cured. She was apparently well, gave birth to a normal baby, and, except for occasional slight abdominal distress, did not complain until December 10, 1934, just about one year after the first attack of dysentery. She again started to have frequent stools, 12 to 18 daily, with slight tenesmus and severe abdominal cramps. In a specimen of fæces sent to me for examination I found both vegetative and encysted amœbæ, numerous cysts of *Blastocystis hominis* and countless spironemas resembling *Sp. eugiratum*, but which were probably no other than *Sp. vincenti*, which were found abundantly in the mouth. The sediment obtained by the deRivas concentration method, when stained, showed an unusual picture of cysts and spironemas. The abundance of spironemas present induced me to take smears from the infected pockets of the

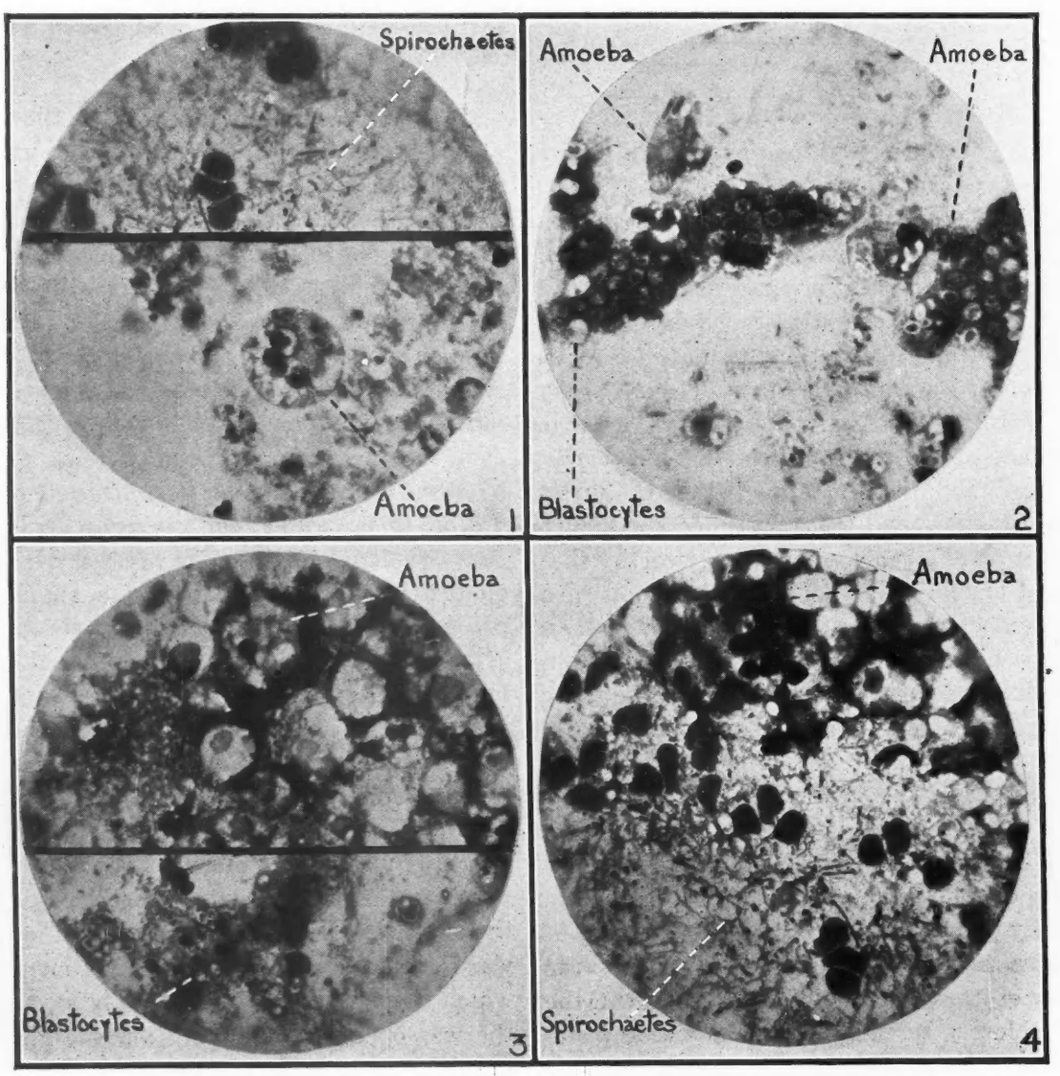

FIG. 1.—Fæces. FIG. 2.—Gums. FIG. 3.—Gums. FIG. 4.—Fæces.

NOTE: In the above plate "Blastocytes" should read "Blastocystis".

gums. These smears showed many fusiform bacilli and Vincent's spirilla, numerous cysts of *Blastocystis hominis*, and a number of amœbæ resembling the Entamœba found in the stool, practically the same picture as found in the fæces.

Even though spironemas, when found in the stools, are usually considered non-pathogenic, I believe that the abundance of them as found in this case may be of pathological significance.

The careful history of the patient's environment, the hygienic condition of the home, the lack of the same infection in any other member of the family, and the history of a long standing mouth infection, suggest that the predisposing factor of the intestinal condition was the mouth infection.

It is of interest to note that the patient's condition cleared up completely after four treatments by the deRivas thermal method. No emetine was given. A hot solution of metaphen, 1-2,000, was used as a mouth wash, and it was advised that this be used for a long period of time. Dental care was stressed.

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THE DERIVAS THERMAL METHOD OF TREATMENT IN INTESTINAL AMŒBIASIS

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THE value of the deRivas method[1] in the treatment of intestinal parasitic infections has been demonstrated by Professor deRivas himself as well as by a number of investigators in tropical countries. In 1931, Professor Lengua, Director of the Department of Tropical Diseases, reported in the *University Hospital Bulletin* a large number of cases successfully treated by this method, and since then at his clinic it has become the method of choice in the treatment of parasitic diseases of the intestine.

While in connection with the University, I had the opportunity of employing this method in 21 cases of amœbic dysentery, 5 cases of acute enteritis (colitis) in adults, and 4 cases of mixed parasitic infestation in children with hookworm and *Trichomonas intestinalis*, who presented a marked dysentery. No emetine was given in any of the cases of amœbic infection, and, except for calcium and iron, given intravenously when indicated by a deficiency, no other therapeutic agent was employed in any of the cases treated.

A surprising improvement was noted even after the first two treatments. The general condition and the symptoms improved in all cases, including those with bacillary infection; the amœbic cases cleared up entirely after six to ten treatments. After the fourth treatment the stools, on careful examination, did not present any amœbæ. Two patients who had ulceration of the mucosa of the sigmoid and rectum showed no sign of the disease after eight treatments.

The method is very simple and could be applied by a nurse, but proper attention must be paid to the temperature of the solution used. If the temperature is below 45° C. when the solution reaches the colon no satisfactory result will be obtained; if above 50° C. when in the colon, the intestinal mucosa may be injured. A temperature of between 45 to 48° C. when in the colon, continued for a period of 10 to 15 minutes, will cause the parasites to loosen from the wall and also lose their virulence; the flushing out of the intestine with solution will then remove them. At the same time, the heat and antiseptic solution exert a healing effect on the intestinal wall, and ulcerated areas have been noted to heal much more readily under this type of treatment than when emetine is given.

The following is a summary of the method suggested by deRivas for the treatment of the colon for parasitic infestation.

1. A light supper in the evening; a purgative at bed time, (magnesium sulphate); and a cleansing enema in the morning.

2. The patient should lie on the right side.

3. A rectal tube is introduced into the rectum and descending colon, a thermometer being introduced to control the temperature.

4. The colon is irrigated with hot solution of copper sulphate,* 1:5,000, from a container showing 50 to 55° C., at a rate of 100 to 200 c.c. per minute. On arrival in the colon the temperature is about 45 to 48° C.

5. deRivas uses one to two litres of solution. I have used two to four litres, allowing the water to escape through a double tube when necessary, to relieve distension.

The patients were given this treatment every day for the first three days, and every other day until cured. I have never had to use more than ten treatments, as even after the fourth or fifth treatment neither amœbæ nor ova were found in the stools after most careful examinations by the simple as well as the concentration (deRivas) method. The simplicity of the treatment and the remarkable effect it has should make it worth a trial in this country, where a number of amœbic infections have been recently reported.

* In place of copper sulphate we have also used Yatren powder, 2:3,000 solution, with excellent results. The price of the chemical, however, makes it impractical for the use of ward patients.

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THE NATURE OF POST-SPLENECTOMY ANÆMIA*

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THE following studies have been undertaken with the intention of finding a possible explanation for the development of anæmia following splenectomy, and, if possible, preventing the development or at least shortening the duration of the anæmia.

Splenectomy was performed on 27 full grown rats. Twelve were put on an ordinary diet and 12 on a diet to which iron-ammonium citrate was added. Fifteen grains of iron-ammonium citrate were given daily by means of a dropper. Three rats died shortly after the splenectomy. Blood studies were made before the splenectomy, and the blood changes were studied daily for ten days, and then once weekly for three months. The blood picture of the rats on the ordinary diet was as follows.

1. Erythrocytes.—The red blood cells dropped about 20 per cent immediately after the splenectomy and continued to diminish for about one week afterwards, dropping another 5 per cent; then they remained stationary for about two weeks. Three weeks after the splenectomy the red blood cells started to increase, reaching within two weeks normal figures, and continued to increase for another three weeks up to 10 and 15 per cent above the original level.

2. Hæmoglobin.—The hæmoglobin diminished to a greater degree than the red blood cells. Immediately after the splenectomy the decrease was only 20 per cent, practically the same as in the case of the red blood cells. During the first week after splenectomy the hæmoglobin diminished another 20 per cent. The hæmoglobin remained stationary for about three weeks and then started to rise again four weeks after the splenectomy. Normal figures were reached within three weeks, that is, seven weeks after the splenectomy. During the following five weeks the hæmoglobin increased slightly above the original level, that is, twelve weeks after the splenectomy the hæmoglobin was about 5 to 8 per cent above the original value.

3. Reticulocytes.—The reticulocytes showed an average of 2 per cent before the splenectomy; they increased immediately after the splenectomy to an average of 8 per cent, remaining at that level for about four weeks. During the following four weeks they gradually came down to an average of about 4 per cent, and

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remained at that level for the rest of the time of observation.

4. Fragility of the red blood cells.—The fragility test showed a slight increase in resistance of the red blood cells immediately after the splenectomy. This increase remained unchanged for the rest of the time of observation.

5. The leucocytes.—The white blood cells increased within a few hours after the splenectomy. The average increase was 150 per cent within twenty-four hours, and 300 per cent three days after splenectomy. They remained at that level for about two weeks, when they gradually decreased in number within the next three weeks to about 100 per cent above the original level. Three months after the splenectomy they were still found to be about 50 to 75 per cent above the original value. The increase was found to be due to an increase in granulocytes and monocytes. The lymphocytes remained unchanged in their absolute number.

6. Thrombocytes.—The platelets increased immediately after the splenectomy about 100 per cent. During the whole time of observation they remained high, and after three months they were still about 50 to 60 per cent above the original level.

The animals which received iron-ammonium citrate showed practically the same results so far as the reticulocytes, fragility of the red blood cells, white blood cells, and the thrombocytes are concerned. The changes in the red blood cells, however, and particularly in the hæmoglobin, were much less marked than in the first group.

Erythrocytes.—The red blood cells decreased about 20 per cent immediately after the splenectomy, and fell another 5 per cent during the first week after the operation. The initial change in this group was exactly the same as in the first group of animals which received an ordinary diet. The subsequent increase was considerably faster. It started about two weeks after the splenectomy. Normal figures were reached within one week and an increase of 15 per cent above the original level was reached within five weeks after the splenectomy, that is, this level was reached three weeks earlier than in the first group, in which it required eight weeks for the same increase.

The hæmoglobin.—The initial decrease of the hæmoglobin was practically the same as in the first group of animals, about 20 per cent. The subsequent decrease, which was another 20 per cent in the first group of animals, was only about 10 per cent in this group. The increase in hæmoglobin started about two weeks after the splenectomy, reaching normal values six weeks later and a level of about 10 per cent above the original eight weeks after the operation. It required twelve weeks for the same process in the first group.

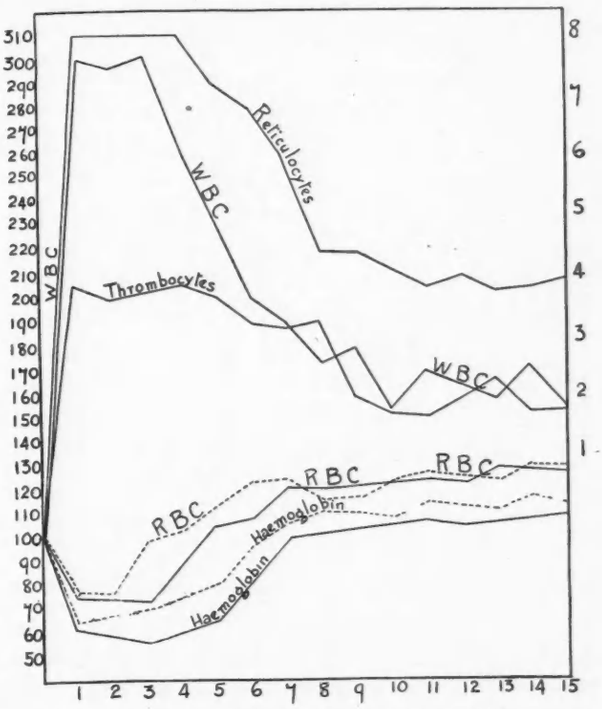

CHART I.—The straight line represents the average findings in the animals without iron therapy, and the broken line, the findings in the animals which received iron. White blood cells and thrombocytes were identical in both groups of animals.

The chart shows the difference in the improvement of the anæmia in the two groups of animals.

The bone-marrow.—The bone-marrow of the long bones was examined in all the animals after the splenectomy. The bone-marrow of the long bones, which is quite fatty in full grown rats, was found to be definitely hyperplastic about nine to ten weeks after the splenectomy.

DISCUSSION

Although the development of a post-splenectomy anæmia could not be entirely prevented, it is quite clear from the experiments quoted that this anæmia can to a slight degree be diminished and its duration definitely shortened.

The development of an hypochromic type of anæmia following splenectomy has been described repeatedly, particularly in the excellent studies of Pearce, Krumbhaar and Frazier.[1]

The effects of splenectomy have been interpreted in different ways. Krumbhaar assumed that with the removal of the spleen a hormone has been removed, which is necessary for erythropoiesis; hence the development of the so-called "post-splenectomy anæmia". We have attempted to interpret the rôle of the spleen in erythropoiesis in a different way.[2] We believe that the normal myeloid system is controlled by the reticulo-endothelial system, and that the removal of the spleen, which contains a large portion of the reticulo-endothelial system, leads to a diminution of the inhibiting effect on the myeloid system, thus favouring a proliferation of all the myeloid elements. Immediately after splenectomy a marked leucocytosis and thrombocytosis appears. The leucocytosis is due to granulocytosis. The myeloid elements which are not increased at once are the red blood cells. This seems to be contradictory to the "inhibition theory". On closer examination, however, this is not so. The type of anæmia that develops after splenectomy is definitely a hypochromic one, that is, an anæmia chiefly due to a reduction in hæmoglobin or, better, due to a reduction of iron. We must consider that with the extirpation of the spleen we have not only removed a fairly large quantity of the iron storage of the organism, but also a fairly large number of cells which are capable of handling the iron metabolism. This fact is very well shown in Krumbhaar's experiments, in which he found that the excretion of iron after splenectomy is definitely increased, which one really must expect if the cells capable of storing iron are diminished. The reticulocytosis after the splenectomy is a definite evidence of the myeloid hyperactivity. The development of a bone-marrow hyperplasia cannot be explained satisfactorily by Krumbhaar's "hormone theory". He admits the possibility of an inhibitory effect of the spleen on the thrombocyte formation.[3] It does not seem plausible that the spleen or the reticulo-endothical system should have an inhibitory effect on one part of the myeloid system — the thrombocyte-forming elements — and a stimulating effect on another part — the erythropoietic portion.

The proliferation of the reticulo-endothelial elements after splenectomy replaces to a certain extent the loss of the spleen, and prevents myeloid hyperplasia from going on indefinitely; occasionally, however, changes resembling leukæmia or polycythæmia may follow.[4]

Our experiments show the development of a post-splenectomy anæmia in rats, as Krumbhaar has shown it in dogs and other animals. Reports in the literature in regard to the prevention of the "post-splenectomy" anæmias are rather contradictory. Asher and Vogel[5] were able to influence this form of anæmia favourably with a high iron diet in dogs. Krumbhaar criticizes their results, because the high iron diet was given three weeks after splenectomy, that is, at a time when recovery would take place spontaneously. Paton, Gulland, and Fowler[6] claim that they found no appreciable degree of anæmia following splenectomy. Their results, however, were based on few animals, and although the experiments were very carefully conducted they were not generally accepted.

With large doses of iron we were not able to prevent the development of anæmia, but we were able to shorten the duration of the anæmia. The failure to prevent the development of the anæmia after splenectomy was to be expected, as was previously stated, and can be explained by the temporary lack of cells capable of handling the iron metabolism, since they had to a certain degree, been removed with the spleen. The compensatory proliferation of reticulo-endothelial elements in other organs leads to a rapid restoration of the iron metabolism of the body.

SUMMARY

1. Splenectomy in rats leads to the development of a "post-splenectomy anæmia".

2. Large doses of iron do not prevent the development of the anæmia, but definitely influence its course favourably.

3. An explanation is offered.

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THE USE OF HYPNOTICS

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IN regard to no complaint is the physician as a rule so careless of his pocketbook as in the treatment of sleeplessness. In how far this indifference is due to the fact that he considers it a minor complaint and one lacking in interest, or to a hesitation to undertake the necessary study of the patient to ascertain the cause, is difficult to say. Sleeplessness is only a symptom; indeed in some cases it is really only an obsession of the patient. He believes he is not getting adequate sleep, though in fact he does sleep an adequate number of hours for the mental and physical exertion that he carries out. Every physician knows how difficult it is to convince the patient of this fact. But if the patient continues to worry, this alone is bad for him, and if the physician does not strive to satisfy him he becomes the easy prey of the vendor of proprietary remedies and a distinct temptation to the counter-prescribing druggist.

If, however, sleeplessness is a symptom, what is its underlying cause? The evidence seems to be accumulating that during sleep, more certainly in the case of sleep produced by a hypnotic, there is a change in the potassium-calcium ratio in the hypothalamus. Sleeplessness occurs in the course of certain of the infectious diseases, yet we do not know whether this is accompanied by a change in metabolism of the brain or not. In a recent article Lord Horder repeats the old observation that many cases of sleeplessness respond as well to a dose of bicarbonate of soda as to a hypnotic. May this not be true and not merely suggestive treatment? Does the soda relieve sensations coming from a hyperacid stomach or from a gas bubble, or may it even make some more remote change after absorption? As yet we do not know. Indigestion is a fertile cause of difficulty in going to sleep. But enough has been said to suggest that a patient's diet and habits should be carefully studied. The carminative effect of alcohol, together with its depressant action, will often serve for a time, and is less dangerous than any of the hypnotics.

The type of sleeplessness due to worry is well known. At no time do the worries of life seem so great and oppressive as after one has gone to bed. Surely it is the family physician's duty to act father confessor and do what he can to relieve his patient. And if continual worry has led to the patient becoming nervous and "jumpy", he resembles the man who has overindulged in coffee or alcohol, in whom every minor and inevitable sensory stimulus arouses a whole train of often disconnected ideas. Careful, systematic questioning will often furnish the physician with data of value; a fundamental cause, such as increased blood pressure or dyspepsia, may be revealed and the main effort directed to this.

It may be admitted that it is often difficult to ascertain the cause of insomnia, and it is easy for the physician to say "Buy some luminal tablets at the drug store and take one before going to bed." But what about the public health? The author or his colleague in this Department was rung up ten times during a twelve-month by physicians who had cases of barbiturate poisoning sufficiently serious as to cause them worry. There were doubtless many more less serious cases. They occur so easily. The patient forgets to take his tablet until just before going to bed. It will be half an hour, and usually longer, before its effect is noted. A quarter of an hour waiting for sleep is an eternity; hence a second tablet, and perhaps a third. Often it is wise to give a barbiturate with the evening meal. Now it is a common effect of all barbiturates to decrease the inhibitions, and this more in some patients than in others. And presently the patient takes a handful of tablets. No hypnotic should be kept by the bedside, and hypnotics in small tablets should be avoided. But unconsciousness, sleep from which the patient cannot be roused, or

the depression next day which adds to the patient's discomfort, is not the most frequent manifestation of barbiturate poisoning, but the skin rashes, manifold in type, resembling well-known and obscure skin conditions. In the old there is often an exacerbation of an eczema. These become again a secondary cause of sleeplessness. Every dermatologist is aware of their existence and their increasing incidence. The careless prescribing of hypnotics is definitely a cause of ill health, a blot on the escutcheon of the physician.

If a physician decides that a patient requires a hypnotic, what should he prescribe? Naturally this will depend on his findings, but the first rule should be a prescription for a limited amount, not more than required for two weeks, and then a re-examination. The prescription should be marked *Ne Repetatur*, and, even if not so marked, the physician should be glad if the druggist calls him up before repeating, especially if a stronger hypnotic has been prescribed. In no case is the queerness of the physicians' mind more incomprehensible than in this, that while they will accuse any druggist of counter-prescribing, yet when the druggist calls them up in such a case, many physicians are impolite and not grateful for the chance of seeing their patients again.

When but a mild effect is required, an assurance to the patient rather than a definite depression, Valerian, often combined with a bromide, may well be tried, or Carbromal (Adalin), the mildest and perhaps the safest hypnotic.

To produce more definite depression there is no doubt that Chloral is to be recommended. First, it must be given in solution to avoid gastric irritation; it acts relatively promptly, especially if water is drunk afterwards, when it soon enters the intestines, and there is little danger of the patient taking repeated doses. Of course, if taken over too prolonged a period of time it may cause cardiac weakness, and it should be given with caution if the myocardium is diseased. But no hypnotic is safe and effective if taken for too long a time, and the physician interested in cure should see his patient every two weeks, when it would be wise to change the prescription. If the patient is regaining his sleep habit, try something milder.

Paraldehyde is a safe hypnotic, as prompt and as effective as Chloral. Its nauseous taste can in part be covered with Tincture of Orange and Cinnamon Water, or it may be given in capsules. Its disagreeable taste may often be made a psychological advantage. Yet it must not be forgotten that habituation to this drug is not unknown.

Barbitone (Veronal) acts slowly, taking three-quarters to one hour, and often longer. It is insoluble in water. Its sodium salt, Soluble Barbitone, is soluble in water but has a persistent bitter taste. Soluble Barbitone precipitates in the gastric juice, and acts as slowly as Barbitone. Barbitone dissolved with the aid of alcohol again is bitter and requires careful covering. There is no doubt that it is best given in solution, as this obviates the dangers of the tablet bottle at the bedside.

Phenobarbitone (Luminal), like Barbitone, is practically insoluble in water; its soluble salt if dissolved in alcohol is bitter. Nevertheless, it is best given in solution. It is more potent than barbitone, is more apt to have a prolonged effect, and, if anything, is more prone to produce skin affections. It has distinct advantages over the other hypnotics in cases that show motor restlessness, just as it is effective in epilepsy. It has been shown to affect the heart and to prevent certain irregularities experimentally produced in animals. There is some reason to believe that it may increase coronary flow slightly and in cases of tachycardia leading to sleeplessness it should certainly be tried. There are a host of other barbiturates—every large supply house produces one. As hypnotics, there is little justification for their being added to a physician's armamentarium. Pentobarbital (Nembutal) is of value as a preliminary to anæsthesia, because its action is short. It will, no doubt, help certain patients to go to sleep, but even in the larger doses of the anæsthetist it acts for only about three hours. It has all the disadvantages in other respects of barbitone. Evipan (Evipal), a barbiturate given intravenously in adequate doses, produces an anæsthesia lasting some twenty minutes. It is very rapidly decomposed in the body. It seems ridiculous that its makers should urge its use as a hypnotic by mouth.

Sulphonal and Methyl Sulphonal also act slowly and their action is prolonged. The graduation of the dose to the patient's needs is im-

portant. They are relatively insoluble, but tasteless. I have known of these being given in powder form, depending on the amount (5 to 20 gr.), with some milk sugar and a little powdered cinnamon or other flavouring which can be varied. Barbitone may be given in a similar fashion. Cardiac disturbances do not occur, digestive ones sometimes, and skin lesions more frequently. These drugs are said to be irregular in their effect. This is true, but is in part due to inadequate or overdosage, or to their administration being too little in advance of bed time. They require skill and experience to obtain the best results, but should be available in order that one hypnotic is not given for too long a time.

Sleepless persons may roughly be divided into two, those who lie still but through whose minds run a perfect stream of ideas and half dreams, and those who toss and fret. In the latter group, bromides are distinctly valuable if used in adequate doses, and should be tried before resort is had to Phenobarbitone. Small doses of Hyoscine may be added in some cases with benefit. Either the sodium or the potassium salt should be used. The sodium is more easily covered. The wonderful combinations of the proprietary houses should be avoided. The Elixir of Potassium Bromide C.F. is palatable and should be used more than it is. Only the weakness of the physician for the exhibition of several bromides led to the Canadian Formulary containing Triple Bromide Elixir. The colour of a sodium bromide mixture may be varied from purplish with Compound Tincture of Cardamoms or Tincture of Cudbear, to pale brown with Solution of Caramel, or to black with Liquorice, a syrup being used in all cases, or dark brown with Compound Syrup of Sassafras.

In all continued cases of sleeplessness, whose fundamental cause cannot be removed, a rotation of hypnotics should be used, the change being made every two or three weeks. Changes in colour or flavour of the mixture may also be used, and in this way an insight may often be obtained into the patient's real need for a hypnotic. Lastly, avoid the new hypnotics, and learn to use with skill those of the Pharmacopœia. They offer an ample range and variety for all cases.

RADIATION THERAPY IN CANCER OF THE CERVIX*

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CANCER of the uterine cervix is one of the forms of major cancer which, if untreated, may be expected in practically every case to terminate the life of the patient in three years. Many of those afflicted will succumb to the disease in one to two years from the time of onset of symptoms.

As a rule the disease begins during the active menstrual life of the individual. The average age of all cases is 48 to 49 years, but it is frequently met with under the age of 35, and indeed many cases occur before the thirtieth year of life. During the past year I have had under treatment a patient only 25 years old in whom the lesion was recognized four weeks after she had given birth to a full term child in a normal spontaneous labour. This patient at the present time, 9 months since treatment, is well and quite free from any evidence of her disease, despite the fact that a very extensive and rapidly growing cancer was present when she was first seen, involving the posterior half of the cervix and extending down the posterior vaginal wall half way to the introitus. All of her treatment has been limited to radiation consisting of deep roentgen therapy and radium. The prognosis in patients under 30 years of age is poor. They seem to lack resistance to the disease; very few survive five years.

To achieve any success whatsoever in the treatment of cancer it is absolutely essential that we realize the necessity of making an early diagnosis in each case. This, at present, seems to be a forlorn possibility for two reasons. Women will not seek or submit to regular routine pelvic examinations, and physicians themselves do not carefully investigate the cause of suspicious pelvic symptoms or subject

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the cervix to careful scrutiny as well as palpation. It is distressing and discouraging to have women state that they consulted not one but several physicians because of pelvic symptoms before an examination of the pelvic field was made. This neglect of prompt investigation of definite symptoms may be very unfortunate for the patient if the symptoms are due to cancer and, especially, to cancer of the cervix.

We fully realize that the only symptom the patient can have that will attract her attention is the detection of a bloody vaginal discharge between the menstrual periods or at a time when no blood should be present. Usually so-called "contact bleeding", following intercourse or the use of a vaginal douche, is an early symptom, and should be regarded with grave suspicion, as polyps or other benign lesions are rarely the cause of this bleeding.

Can we hope to have bleeding in sufficient amount to attract the patient's attention soon enough to permit us to make a diagnosis in an early stage of the disease, or at least while the cancer is still limited to the vaginal portion of the cervix? I doubt it, because cancer of the cervix usually first establishes itself beneath the mucous membrane as an infiltrating lesion, and the ulceration is a later or secondary stage of the disease. Since we cannot have blood loss until ulceration has occurred it is evident that early diagnosis dependent upon this symptom is quite improbable in this infiltrating or invading type of cervical cancer.

On the other hand, a small percentage of the cases begin as a soft, spongy, fungating, cauliflower type of tumour which grows on the surface of the cervix and projects from it into the vaginal canal. This clinical variety is slow to invade, is easily injured, causes profuse bleeding and foul discharge, and is curable often, even when it appears to fill the entire vaginal vault.

We have already said that cancer of the cervix occurs most often during the active menstrual period of life, that in most instances none or very little ulceration is evident in the earliest stages; also statistics indicate that 94 to 96 per cent of the women who develop cervical cancer have borne children. It would seem, therefore, highly desirable to encourage, especially, all married women to undergo careful and thorough physical examinations at regular intervals, including a speculum examination of the cervix. In this way the presence of cervical erosions, cysts, lacerations, areas of unusual hardness, leucoplakia, polyps, and other benign or pre-cancerous lesions can be identified and properly treated.

The influence of heredity cannot be entirely overlooked in the etiology of cervical cancer. It seems to be rather definite, and especially on the maternal side. Schäfer, in a recent study, concludes that 22 per cent of the cases of cancer of the cervix studied by him showed hereditary carcinoma, and in most cases the hereditary tendency concerned the same sex organ. This observation has been made by others, and it would suggest the importance of a careful survey, at frequent intervals, of the cervices of women with a family history of cancer.

Biopsy can be done on suspicious looking erosions or ulcerations. The Schiller iodine test can be used on the non-ulcerated cervix, and if a positive reaction suggestive of possible early carcinoma in the underlying tissue is obtained a biopsy should be done on this area. May I say here that it is almost impossible for any of us to make an exact diagnosis in an early lesion without an opinion from a competent pathologist upon a biopsy specimen removed from the lesion.

The Schiller iodine or so-called vital stain test is based upon the presence of glycogen in the surface layers of normal epithelium. Lugol's iodine solution is used for the test. When the iodine comes in contact with the normal glycogen-containing epithelium, a uniform deep brown stain results. Now it happens that in certain abnormal conditions the glycogen is absent from the superficial epithelial layer therefore these areas do not stain darkly, but remain a very light yellow. Schiller, in a study of a large series of early carcinomata of the cervix, demonstrated that already during its initial phases the carcinoma loses abruptly and almost completely the glycogen content which characterizes the upper layer of the normal epithelium of the portio. Practically all forms of leukoplakia of the cervix give this reaction. Therefore whether a patch of leukoplakia demonstrated by this test is or is not a carcinoma cannot be determined until the suspicious patch has been studied histologically.

The object, then, of the iodine application is to call attention to suspicious spots of the epithelium; it cannot do more. The test has the advantage of easy application. The entire portio is painted with the solution and the excess is then wiped off. With a good light variations in colour effect are readily determined. Unfortunately 90 per cent or more of the cases when first seen have well-established ulcerative lesions, and there is little doubt of the clinical diagnosis in such cases.

It is safe to say that not more than 10 per cent of the cases we see can be regarded as clinically suitable for a Wertheim hysterectomy. However it is our belief that even these most favourable cases will be cured by our present methods of radiation therapy and without the high mortality rate associated with the radical operation.

Assuming then that we are confronted by a definite proved case of carcinoma of the cervix, what should be our therapeutic procedure? To a certain extent this will depend upon the extent of the cervical disease, also whether or not the rectum and bladder are involved. The general condition of the patient, and evidence of distant or bulky parametrial metastases, all influence our decision regarding treatment.

It is helpful and desirable to have a clinical classification to guide one in planning treatment, as well as for prognosis and future conclusions as to end-results. We believe a satisfactory grouping is that followed at the Memorial Hospital, New York, which divides the cases into four groups.—

1. Early cases—The disease is limited to the cervix and does not increase its size to any marked extent.

2. Borderline cases—The cancer has spread from the cervix to the adjoining vaginal wall and involves to a moderate extent the parametria close to the cervix on one or more sides, but without marked fixation of the cervix.

3. Advanced cases—The parametria, as well as the cervix and vaginal vault, are involved extensively and the cervix is fixed firmly in the pelvis by the surrounding disease.

4. Very advanced cases with a so-called "frozen" pelvis, with or without vesical or rectal fistula, in which only palliative treatment or nothing at all can be attempted.

The cases in the early group are favourable for cure, and 50 to 60 per cent should be cured for five or more years by radiation. These cases, even though ulcerative, rarely have much coincident bacterial infection; therefore one can apply radium at once without risk to the lesion and follow this treatment with deep roentgen-ray therapy.

The cases in the borderline and advanced groups constitute 75 to 80 per cent of all the patients. In these the cervical lesion is usually extensively ulcerated, infected, and necrotic, and there is more or less associated pelvic lymphangitis, if not cellulitis. These patients at times have constitutional symptoms due to anæmia from hæmorrhage, or to toxæmia from absorption of toxic products. We have learned that it is unwise to apply radium immediately to cases in these groups without preliminary treatment directed to preparing the lesion and the pelvic field for such application. Radium is a powerful agent, and when placed in direct contact with an ulcerated, infected cancer is apt to cause a very sharp reaction, not only in the cancer but also in the adjoining tissues. It will cause rapid necrosis, and when this is complicated by infection the resulting destruction of tissue may be much more extensive than is desired and lead to prolonged prostration of the patient, continued sloughing of tissues, severe secondary hæmorrhages, the formation of fistulæ, and death.

Based upon our experience at the Memorial Hospital in the treatment of nearly 3,000 patients afflicted with cancer of the cervix, it is our belief that the best results, with the least risk to the patient, are obtained in all but the early or most favourable cases by giving the deep roentgen-ray therapy first and withholding the radium applications until definite improvement and response to the x-ray treatment can be observed. This will be shown by shrinkage in the size of the lesion, disappearance of the necrotic, soft, cancer tissues, and replacement of the same by a healthy, reddish, granulation-tissue-like surface. In fact, under our present plan of prolonged x-ray treatment by means of multiple small doses the primary lesion on the cervix often shows complete surface healing before any radium has been applied.

The very advanced, or Group 4, cases, if treated at all, receive deep roentgen therapy and occasionally a small application of radium.

In Groups 2 and 3 one may find it helpful as an aid in quickly reducing the size of a large fungating cancer mass to use the actual cautery or cautery snare, especially where the lesion is bleeding profusely and prompt control of hæmorrhage is necessary. Otherwise, cauterization is not employed by us.

RADIATION THERAPY

From 1922 to date our plan of radiation has consisted always of a combination of x-ray for the parametria and radium for the primary lesion. For a number of years it consisted of one cycle of deep x-ray, 2 anterior, 2 posterior fields; daily treatments, one field daily; 700 r to 750 r, 50 cm. T.S.D.; 0.5 mm. copper, 2 mm. aluminum; 200 k.v. 30 ma. One to two weeks later a vaginal application of radium would be made to the cervix and vaginal fornices for 1,000 to 3,000 millicurie hours. A day later, under general anæsthesia, radium capsules 0.5 mm. gold, 2 mm. black rubber filtration, were placed within the cervical and uterine canals for 3,000 m.c. hours; eight weeks later a second pelvic cycle, similar to the first, was given. This terminated all of our planned or routine treatment, and you see it required about ten to twelve weeks.

For many years we have not used interstitial radiation, consisting of needles or radon seeds, as a part of our routine treatment. We feel that there is a real risk of causing metastases if needles or seeds are placed in actively growing, healthy cancer tissues, and that they should never be used as a part of the primary treatment. We believe, however, that interstitial radiation may be used to advantage to take care of any part of the cervical or vaginal lesion that fails to respond satisfactorily to the primary treatment, as you will then be dealing with a sick or regressing lesion that has already been irradiated and the risk of causing metastases will not be so great.

With the plan of treatment outlined above our end-results, or five year salvage, have been 55 per cent cures in the early group, 34.6 in the borderline group, and 15 in the advanced group.

A comparison of these results with those published by other large clinics throughout the world shows very little variation. Consequently it has been evident to us for some time that the peak had been reached unless we could improve our method of radiation.

The fundamental principle of the method followed by us has been radium in full dosage for the lesion in the cervix and the tissues immediately adjoining it; x-ray for the parametrial and distant pelvic extensions of the cancer. We have been uniformly successful in controlling the primary disease in the cervix, but we have failed to control the metastases. The patients have remained free from recurrence of cancer in the cervix, but have died from metastatic cancer.

It does not require much intelligence to realize that we must find some means of clearing up the parametrial metastases. In an effort to do this we have for the past sixteen months, in cooperation with the departments of physics and of roentgen therapy, been carrying on a new plan of treatment designed to increase materially the dosage of effective roentgen radiation reaching the entire parametrial field. This has been accomplished by reducing the amount given at a single treatment, and by increasing the target skin distance, other factors remaining the same as before, except that the number of treatments was greatly increased, so that the patient instead of receiving only four treatments received twenty or more. This plan seemed to work out so satisfactorily that more recently we have been resorting to six fields instead of the customary four by adding two lateral fields. At the present time, therefore, the method followed is, as before, to give the x-ray series first in practically all the group 2 and group 3 cases, and to promptly follow it with the radium applications.

The x-ray factors are 200 k.v.; 0.5 mm. copper, 2 mm. aluminum filtration; 30 ma. current, 70 cm. T.S.D.; 6 fields (2 anterior, 2 posterior, 2 lateral), each 10 x 15 cm.; 300 r units daily to each field treated, two opposite fields treated daily; treatments continued until 2100 r have been given to each field. This requires twenty-one treatment days. It is of interest to know that the patients stand the treatments quite well. There is rarely any severe constitutional reaction, although nausea is quite common, and a moderate amount of intestinal irritation, indicated by diarrhœa and cramp-like pains, may occur. Bladder symptoms, such as frequency and burning, may occur, but are mild and respond to diet and medication. The skin reactions are fairly well marked in all cases, con-

sisting usually of moderate desquamation and tanning. Seldom are they severe enough to require a cessation of treatment. The dosage of radium used and the manner of application remains the same as previously described.

This method of external roentgen radiation by means of six fields has been used too short a time for us to express any opinion as to its ultimate value in raising our percentage of five year cures. However, it increases considerably the amount of effective radiation distributed throughout the parametrium, and tends to bring about a distribution varying from three and one-half to four threshold erythema doses in these structures. It is reasonable to believe that this amount of radiation will tend to inhibit the activity of metastatic cervical cancer cells exposed to it, if it does not cause their complete disappearance.

In conclusion, we believe that the evidence available today indicates that more satisfactory results follow radiation therapy than follow surgical procedures in the majority of cases of cervical cancer treated. It would also seem that there is still room for improvement in our methods of radiation therapy.

BONE TUMOURS AND IRRADIATION*

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IRRADIATION by means of radium and x-rays is a comparatively new science, when we consider that all of the research and clinical applications have been limited to the past thirty years. The technique and methods used in radiation have necessarily changed from time to time, and while each clinic may favour a different procedure all are striving toward the same goal, and that goal is the cure of cancer. It is our aim to cure and control not only the early cases but also the far-advanced cancerous growths.

The success of any one method of treatment for bone tumours has not been particularly gratifying. Part of our research program at the State Institute for the Study of Malignant Disease is to determine the extent of benefits derived from irradiation. Some cells, of course, respond more readily to irradiation than others, and are classified according to radiosensitivity as follows: (1) lymphoid cells; (2) epithelial cells; (3) endothelial cells; of blood vessels; (4) connective-tissue; (5) muscle; (6) bone; (7) nerve.

According to this, bone cells are very radioresistant, and are surpassed in this respect only by nerve cells. Due to the lack of response of bone cells to radiation the results in most cases are unsatisfactory. There is, however, one type of growth found in bone which is radiosensitive, namely the Ewing sarcoma, also known as endothelial myeloma and lymphoma of bone.

The true *giant cell tumour,* commonly located in the lower end of the femur or radius, or in the upper portion of the tibia, is essentially an epiphyseal tumour. The radiographic characteristics of the giant cell tumour usually emphasize bone destruction. The lesion assumes an asymmetrical position in an epiphysis and the expanded bony shell is very thin. In the early stage, trabeculations will be visualized passing through the tumour; later, they disappear as the growth advances. As a rule the periosteum adjacent to the tumour shows no reaction. There is another form of giant-cell variant, namely the *bone cyst,* occurring in the shaft of a long bone, not involving the epiphysis but frequently growing to it. These tumours occur more frequently in young people. Upon section this tumour also shows giant cells, but an endeavour is made to differentiate it from the true giant cell tumour. This growth responds readily to radiation, especially when it is located in the upper

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portion of the shaft of the femur. At our clinic the true giant-cell tumour and the bone cyst are treated with 200 K.V. x-ray at 40 per cent of an erythema dose on every other day for three doses, thus delivering about 120 per cent into the tumour.

With a wave length of .16 A an erythema is equivalent to 800 r air and 1,200 r tissue scattering. Radiation causes a reaction in the tumour, accompanied by swelling of the soft parts about it. This continues from four to eight weeks, after which the reaction subsides and the tumour regresses. At this time calcification is noticed within the bony shell of the tumour, which later becomes dense bone. This evidence of repair is shown more rapidly in younger patients, while in the older patients two to four months may elapse before repair is evident. The response in these tumours is more promising in those cases in which no surgery has been attempted. Radiation of giant-cell tumours is fast becoming the method of choice and is supplanting surgery. The deformity following radiation may be greater than with resection and bone graft, but the risk to the patient is much less with radiation. The results from surgery and from radiation are equally good.

True bone cysts of the type occurring in young patients in the mid-shaft of a long bone, and commonly associated with fracture, are radio-resistant. One of our cases was treated with radiation and healed after seven years. Radiation played little if any part in the cure, because it is an established fact that bone cysts will heal spontaneously, and if this particular tumour had been influenced by radiation no doubt the cure would have resulted in a much shorter time. *Exostoses* will not respond to radition, and *chondromas* may be retarded but are never cured, as cartilaginous tumours are radio-resistant.

Recently there has been much discussion concerning the causation and treatment of *osteitis fibrosa cystica.* It is agreed that the parathyroids play an important rôle in the causation, and surgical removal of these glands has given relief, but not until recently have cases been reported in which cures were obtained by means of radiation of the parathyroids. Surgery of the parathyroids is difficult at times because of the varied location of the glands, which may be found from the region of the larynx to the mediastinum, and radiation was deemed a more logical method of treatment. Merritt, in 1933, reported 3 cases of osteitis fibrosa cystica in which the parathyroid glands were radiated, with the result that there was improvement of the bony lesions and relief of pain, so that the patients were finally able to return to their normal occupations.

Closely allied to osteitis fibrosa cystica is *Paget's disease* of bone or *osteitis deformans,* which in our experience has not responded to radiation. The bones themselves and the parathyroid regions have been radiated, but no results have been obtained to date.

Primary chondromyxosarcoma, a very malignant type of bone tumour, is very radio-resistant. Radiograms of this tumour show a translucent shadow outside of, but next to, the shaft of the long bone, with new bone formation perpendicular to the shaft and some raising of the periosteum adjacent to the involved bone. These cases have been treated with radium packs and with 200 K.V. x-ray, but to date the primary chondromyxosarcomas have remained uninfluenced by radiation.

Secondary chondromyxosarcomas are malignant growths superimposed on benign exostoses or chondromas. They are not so malignant as the primary type, are slower-growing, and at times attain an enormous size. Our experiences and methods of treatment with this growth have been varied. All types of radiation, except interstitial, have been used, including 200 K.V. x-ray, radium salt filtered through 0.5 mm. brass, 0.5 mm. gold and 1 mm. rubber, placed into the tumour at the time of operation, and radium packs using cross-firing fields. These tumours are composed of cartilaginous and myxomatous tissue, two types of tissue which in our experience are very radio-resistant. Bloodgood reports having kept myxomatous cells alive for eighty-eight days after the cells had received a carcinomatous dose of radiation. Sampson Handley, of London, in 1928, reported having treated secondary chondromyxosarcomas in a manner similar to ours by chiseling away as much of the tumour as possible, and placing 500 mg. of radium salt in 1 mm. pt in the wound for 24 hours. Of 5 patients treated by this method, 1 was well for 3 years, and 2 had recurrences after 3 years of

active life and freedom from pain. Some of our patients have continued for 4 and 5 years, but finally died from the disease.

Osteogenic sarcoma of the *osteolytic type* is a very rapidly-growing malignant tumour. The radiogram of this lesion shows involvement of the shaft of a long bone, with definite periosteal involvement, thinning of the cortical shadow, widening and mottling of the medullary cavity, and new-bone formation laid down perpendicularly to the shaft. In far-advanced cases the destruction will be more marked, invasion of the surrounding soft tissues will be increased, and the shaft of the involved bone will be visualized passing through the tumour mass. This form of osteogenic sarcoma has been treated with the 4 gm. pack, interstitial radiation by means of 6 mg. radium salt needles, and 200 K.V. x-ray, using various filters of 3 mm. Cu, 0.5 mm. Al and 0.5 mm. Cu or Thoreaus, and treating multiple fields. Treatments are given daily over long periods of time, some continuing for 21 days. To date, these methods have not yielded encouraging results, as none of the patients have survived a five-year period, and most of them have succumbed within the first year after the onset of symptoms.

The *sclerosing type* of *osteogenic sarcoma* responds more favourably to radiation. The radiographic characteristics of this tumour are lack of differentiation between the cortex and medulla, with marked sclerosis of the entire tumour mass, which may occupy half of the shaft of a long bone. These tumours are slow-growing and not so malignant as the osteolytic type, being composed of cells which are more differentiated. They respond quite favourably to radiation, and one of our patients has been alive for over five years. The tumour is not progressing and there is no evidence of metastatic growth in the chest. Recently this patient sustained a severe injury to the tumour causing swelling, ecchymosis and severe pain, but four months have elapsed since the trauma and apparently the tumour was uninfluenced by it.

Fibrosarcoma of bone also reacts favourably to radiation. This tumour grows more slowly and is less malignant than some of those mentioned. One of our cases of fibrosarcoma of the lower jaw was biopsied and then irradiated with high voltage x-ray and radium pack. Today there is no evidence of recurrence, and the patient has remained well for over six years.

Ewing's sarcoma, strictly speaking, is non-osseous in origin, but occurs in bone, arising possibly from the lymphatics. The radiographic characteristics are as follows. The tumour usually involves one-half to three-quarters of the shaft of a long bone; new bone is laid down parallel to the shaft, the shaft is widened, the cortex is thickened, and the medullary cavity is mottled. In the early stages the lesion is sclerotic, later becoming osteolytic. Ewing states "There are reported cures by irradiation alone, and there are four records of four cases by radiation and excision." Our experience with this tumour has been that the local lesion will respond to irradiation, even after a surgical operation has been performed with the incomplete removal of the tumour. All of our patients have died eventually with metastasis to the lungs. Radiation of the lung metastases in one case caused the metastases to disappear for a time, only to reappear in abundance elsewhere in the chest and cause death. Some of the patients remained well for two to three and one-half years, but as yet a five-year cure with radiation alone has not been effected. Irradiation of the primary growth will relieve pain, reduce the temperature and the leucocyte count, and diminish the tumour with marked rapidity. Sclerosis of the tumour takes place after radiation. If the lesion has not been controlled by this therapy, the tumour will become osteolytic in type, and in the far-advanced cases will cause a pathological fracture.

In this type of tumour radiation treatment becomes a diagnostic agent, because no primary bone tumour responds to radiation as does the Ewing sarcoma. Therefore, when in doubt as to diagnosis, radiation therapy may cause the tumour and accompanying symptoms to disappear, thus pointing the way to the correct conclusion.

Metastatic carcinoma is a perplexing problem for the surgeon, and radiation plays an important rôle in this field also. Carcinomas of the thyroid gland, breast, bladder, prostate, kidney and uterus do metastasize to bone. The lesions of all but the prostate are osteolytic in type, as is shown on the radiogram, with marked destruction of bone of the osteoblastic type, with a building-up process which usually affects more than one bone. Occasionally, in breast metastasis to bone, the osteoblastic changes will predominate, but that is not the

rule. The prominent symptom of carcinoma metastasis to bone is pain. Patients in the terminal stages of this disease will complain of neuritic pain in the arms and legs, from a metastasis in the spine. The pain in breast metastasis to spine is caused by pressure or infiltration of the lumbar nerve roots. Prostatic metastasis is associated with pain, because the prostate is situated close to the nerves of the sacral and lumbar plexes. In a large percentage of metastasis to bone irradiation of the affected bones will give relief from pain for at least a short time, and perhaps for a long period, depending on the radiosensitivity of the cells causing the pressure or irritation and on the amount of involvement about the sensory nerves. The results obtained with irradiation are remarkable at times. Patients have come to the hospital on a stretcher for treatment and have returned in two months or so, walking with the aid of a cane and free from pain. This analgesic effect of radiation upon metastatic carcinoma to bone is not to be under-estimated, especially in the terminal stages of the disease. At times the metastatic lesions will be replaced by or filled in with dense bone, and will remain well for a three-year period. Breast metastases respond most promptly to irradiation; thyroid metastases are the next to respond readily; and metastases from the prostate respond the least.

Another group of diseases causing bone involvement includes *Hodgkin's disease, lymphosarcoma* and *lymphatic leukæmia.* These types usually respond readily to irradiation, and it has been our experience that the bony lesions will react to the same degree as do the primary nodes. A doctor's wife appeared at our clinic in 1928 with nodes in the neck, retro-peritoneal masses, and mediastinal involvement. Biopsy from a node revealed a lymphosarcoma, and small amounts of filtered radiation were given, to which the superficial and mediastinal nodes reacted very well. About five years later the patient complained of severe pain in the left femur, was unable to walk and a radiogram showed involvement of the femur. The femur was treated with x-ray, responded, and to date (over a year, the patient is free from pain and appears quite normal. Some authorities differ as to which is more radiosensitive — Ewing's sarcoma, or Hodgkin's and lymphosarcoma involving bone; we believe that Hodgkin's disease and lymphosarcoma are the most sensitive.

SUMMARY

1. Bone tumours as a group are very difficult to cure, no matter what the therapeutic agent may be. Giant-cell tumours and certain types of cysts can be cured with irradiation alone.

2. Osteitis fibrosa cystica can be controlled, the symptoms relieved, and the patients returned to their normal occupations by irradiation of the parathyroid area.

3. Osteitis deformans (Paget's disease) is not influenced by irradiation of the affected bones or the parathyroid area.

4. Primary chondrosarcoma is not influenced by irradiation.

5. The growth of secondary chondrosarcoma can be retarded, but not cured, by irradiation.

6. Osteogenic sarcoma is not radiosensitive, but the sclerosing type will respond to irradiation.

7. Ewing's sarcoma will respond readily to irradiation, but the metastases tend to cause death.

8. Fibrosarcoma of bone will receive good palliation and in some cases be cured with irradiation.

9. Irradiation of metastatic carcinoma causes relief in a large percentage of cases and promotes regeneration of bone.

10. The treatment of bone tumours should be surgery and irradiation, either alone or in combination, because cures have been obtained in the past by these methods. However, as irradiation becomes more widely used and the technique of radiation therapy improves, more cures of bone tumours will be effected.

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LATENT SYPHILIS*

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THIS paper is in large part a consideration of the findings in a study of latent syphilis, conducted by the Co-Operative Group Clinics of five leading American universities, with the collaboration of the United States Public Health Service, and under the ægis of the Health Section of the League of Nations. This study represents five years of painstaking investigation. It was warranted by the lack of any definite data on the subject and by reason of the vague and conflicting ideas and opinions in regard to this phase of syphilitic infection.

In the *Bulletin of Johns Hopkins Hospital,* August, 1932, Uno J. Wile writes: "Although some consideration of this phase of the disease has been given by competent syphilologists, so far as I know little or nothing has been written concerning it." Harrison, the dean of British venereologists, admits, in a recent communication, that no current clinical research on this subject is being carried on in Great Britain. A volume by Griffith Evans, published this year in London, has, however, been reviewed and some of his conclusions incorporated in this paper.

The six bodies contributing to this study were: the syphilis clinics of (1) The Johns Hopkins University, headed by Dr. J. E. Moore; (2) The University of Pennsylvania, headed by Dr. John H. Stokes; (3) The Western Reserve University, through Dr. H. N. Cole; (4) The Mayo Clinic, under Dr. Paul O'Leary; (5) The University of Michigan, under Dr. Uno J. Wile; and (6) The United States Public Health Service. I shall give what I consider to be the most useful conclusions evolved, and follow this with a few charts.

The importance to the general practitioner of a thorough understanding of the problems of latent syphilis is obvious from the fact that, approximately, one of every three syphilitic patients whom he sees will be in the latent stage of the disease. In Turner's study of 10,000 clinic patients, one-third of all males and nearly one-half of all females presenting themselves for treatment had no physical evidence of the disease. It is also true that probably half the patients with latent and late syphilis give no history of infection. These facts, then, that almost half the syphilis patients one sees show no physical evidence of the disease, and that 50 per cent give no history of infection, surely warrant a careful consideration of this phase of the disease.

Latent syphilis can be defined accurately only in terms of the biological course of syphilitic infection. When the virus is freshly introduced into a human being multiplication of the organism first occurs at the inoculated site. This is followed by dissemination by way of the lymphatics and blood stream. In the usual course of events, a chancre develops at the portal of entry, an inguinal adenitis occurs, and, after an interval, the cutaneous, mucosal and constitutional symptoms of early secondary syphilis appear. Even though the patient is untreated, the lesions of the secondary outbreak heal spontaneously after a variable period of time ranging from a few days to many months. The next few years are marked by their uneventfulness. Either the individual shows no obvious physical evidence of syphilitic infection, or, in a relatively small proportion of cases, relapses of a secondary type may appear, usually insignificant, transitory, and, in most cases, limited to the mucosæ. Finally, even these cease to occur, and a period of complete quiescence ensues. This is known as latency.

Latent syphilis may be divided into (1) clinical latency, (2) serological latency, and (3) pathological or biological latency. These three terms are not mutually interchangeable. Clinical latency means nothing more than clinically unrecognizable syphilitic infection; sero-

* An address delivered at the Annual Meeting of the Manitoba Medical Association, Winnipeg, September 10 to 12, 1934.

logical latency implies that tests of blood and spinal fluid are negative; pathological or biological latency means that the spirochætes present in body tissues provoke no inflammatory reaction, the balance between host and invading organisms being maintained. In this paper, "latency" must be interpreted as referring only to clinical latency.

A clinical diagnosis of latent syphilis assumes that the most searching physical examination, including particular emphasis on study of the cardiovascular and nervous systems and of the special senses, has revealed no lesions definitely attributable to the disease, and that the diagnosis rests either on a positive serological test, or, if this is negative, on a clear-cut history of infection inadequately treated, or, in the female, on the birth of a syphilitic child. From the standpoint of practical medicine, therefore, no better definition of latency can be given than "clinically unrecognizable disease".

We must make an exception in the case of patients with spinal fluid abnormalities and in those with demonstrable cardiac lesions. It is more or less generally agreed that increased cells and protein, a positive Wassermann test, and an abnormal colloidal curve in the spinal fluid mean not only invasion of the central nervous system by the Treponema but actual tissue involvement, even though there may be no objective clinical evidence of neurological damage. A patient with such an abnormal spinal fluid can hardly be properly classified as a latent syphilitic.

If spinal fluid abnormalities are present in the absence of clinical evidence of neurosyphilis the condition is known as asymptomatic neurosyphilis. This was found to be the case in 15 per cent of patients primarily diagnosed as having latent syphilis. The importance of routine lumbar puncture and the absolute necessity of carrying this out in every patient with syphilis, early or late, is apparent from the fact that spinal fluid abnormalities antedate the appearance of obvious clinical damage in the nervous system by many years. The potential paretic or tabetic patient is recognizable within the first year of the infection. This is admittedly preferable to recognition fifteen years later, when irreparable harm may already have been done. As the latent syphilitic can only be recognized by means of a routine blood Wassermann test, so can the latent neuro-syphilitic only be discovered by means of routine spinal fluid studies. If recognized before the development of clinical symptoms and signs, their appearance may usually, in fact almost always, be prevented by appropriate modifications of treatment. The physician who omits to perform a routine spinal puncture in every patient diagnosed as syphilitic is indeed negligent.

It is important to know also what to predict after the discovery of a normal spinal fluid. Supposing that the fluid of a patient with early syphilis has been found to be normal after six months or a year of treatment, it will be found to be normal (with very few exceptions) at any later date, provided that the regular routine treatment is given. If, after the original negative tests of the cerebrospinal fluid, there is no evidence of clinical relapse, and if the blood Wassermann test remains persistently negative, lumbar puncture need not be repeated until the end of the post-treatment year of probation. If again negative at this examination, the test need never be repeated in the average patient. If in patients with syphilis of more than four years' duration the cerebrospinal fluid is found to be normal, and if the patient is free from obvious neurological damage, lumbar puncture need never be again done; subsequent fluid examinations will always be normal. Not only does a negative examination of the cerebrospinal fluid, either in early or late syphilis, afford a practical guarantee against the subsequent development of abnormalities in the fluid but it also affords equally satisfactory security against the later appearance of grave signs or symptoms of neurological damage. One never observes the appearance of tabes or paresis in a patient with a previously known negative spinal fluid. Further clinical advances in the earlier diagnosis of cardiovascular syphilis, including the recognition of simple aortitis before the development of aortic regurgitation or aneurysm, will tend to remove many patients in this field from the diagnostic category of latent syphilis.

It is probable that the patient's own defence mechanism is not fully established until after the evolution and healing of the lesions of early syphilis. The time required for this varies in different individuals, but is doubtless complete by the end of the fourth year. A more or less arbitrary dividing point has therefore been made

at this period from date of infection between early and late latency.

It was thought that symptomless infections in man meant either poor memory or deliberate deceit. Now, however, with the proof that animals may be actually infected with no obvious lesion at the portal of entry or elsewhere, the negative stories of patients assume a new importance. Symptomless infection in man not only occurs, but is frequent. The importance of this lies in the fact that these individuals are recognized as syphilitic only by the accident of routine serological testing when some other disease makes medical advice necessary, or by the development of some lesion of late syphilis, and that, free from obvious lesions, they may act, in some instances at least, as carriers and transmit the disease to others. This is particularly true of women, in whom there is considerable risk of transmission of the infection to the next generation.

Our ideal as a profession is the eradication of syphilis by the universal application of early diagnosis and early adequate treatment. This considerable group of patients with symptomless infections constitutes the main, indeed the only insurmountable, impediment to the realization of this ideal. They are the justification, if any were needed, for insistence on the extension of the practice of making routine serological tests of the blood.

It is a common experience in analyzing the previous history of groups of patients with various types of late syphilis, especially cardiovascular and neurosyphilis, to find that the vast majority of them have received no previous treatment, and that few have had anything approaching modern standards of adequate treatment for early syphilis.

In order to properly evaluate the results of treatment in a given disease it is essential to know the probable outcome if no treatment is given. This has been shown by Bruusgaard in Norway. His data are probably the only ones that ever will be recorded, since the high probability of cure of early syphilis attainable with modern treatment makes the omission of treatment an unjustifiable procedure.

The Syphilis Clinic at the Oslo Hospital, with which Bruusgaard is connected, serves a stable, well educated population; it has for years been staffed by competent physicians, and between the years 1891 and 1916 its chief, Doctor Boeck, believed that patients with early syphilis did about as well without any treatment as with the mercurial therapy then in vogue. In these years 2,181 patients, diagnosed as primary or secondary syphilis, were admitted to the Oslo Clinic. Many of them received no treatment. Some received a little mercury by mouth, or potassium iodide, or both, but for all practical purposes it can be said that these patients were untreated.

TABLE I.

THE PROBABLE OUTCOME OF UNTREATED AND TREATED LATENT SYPHILIS

Outcome	*Approximate percentage of patients in whom specified results may be expected to develop*		
	Untreated		Treated
Cure (Blood Wassermann Reaction and Cerebrospinal Fluid negative); no lesions	25-35		85
Infection remains latent (Blood Wassermann Reaction positive: Cerebrospinal Fluid negative); no lesions	25-35		7½
Late syphilis (skin mucosa, osseous)	10-15	20 to 33	2 to 5
Cardiovascular syphilis	10-15		
Neurosyphilis	1-2		
Visceral syphilis, other than cardiovascular	½-1		

In the years 1925 to 1927 Bruusgaard was successful in following 473 of the original 2,181 patients. Three hundred and nine were living and each of these was completely re-examined physically, with special emphasis on the cardiovascular and nervous systems. One hundred and sixty-four were dead. Most of these had died in the Oslo Hospital, the cause of death being known; in 40, necropsies had been obtained. The majority of the patients were re-examined or had died more than twenty years after infection. Thirty-seven per cent of the total number had developed active lesions of late syphilis; 22 per cent had died of some unrelated cause, and nearly half of this group lived for twenty years or more after infection without developing any lesion. In 14 per cent the only evidence of infection was a persistently positive blood Wassermann reaction; in 27 per cent, "clinical arrest" or "cure" seemed to have occurred in spite of the absence of treatment. This is not to be construed as an argument for the abandonment of the treatment of syphilis, whether early or latent. The results achievable by nature can be materially improved upon by adequate treat-

ment, and, indeed, there is evidence to indicate that if treatment can be started early enough, and if it is continuous and sufficiently prolonged, there is almost a 100 per cent probability of cure. As for latent syphilis, it is apparent that every patient with obvious late syphilis has passed through a stage of latency. Approximately one-third of the clinical material of any large syphilis clinic is made up of patients with obvious lesions of late syphilis, who had they been seen a few months or years earlier would have been diagnosed as latent syphilis. The object of treatment in latent syphilis is, therefore, from the standpoint of the individual patient, to prevent, if possible, the development of late lesions of the disease, and to improve the chance of a completely favourable outcome, and, from the standpoint of public health, to prevent transmission of the disease to others.

While it is probably true that in most instances the disease is infectious with diminishing frequency for not more than five years, nevertheless, the danger to the marital partner from symptomless infection is considerable. The possibility of late transmission from mucous surfaces, even in the absence of demonstrable lesions, or from semen, cannot be dismissed. Equally important is the transmission of infection to the next generation by women with latent syphilis. There is only a 16 per cent chance that an untreated syphilitic woman will have a living healthy baby, against a 76 per cent chance in the average non-syphilitic woman. That this gloomy state of affairs may be completely altered by treatment of the mother during pregnancy can be definitely shown.

The pathology of latent syphilis has been studied extensively by Warthin. He has shown that the harmony between host and parasite is more apparent than real, that beneath a serene outward surface slow fibrotic changes are occurring in important viscera, and that syphilis can be said to be latent only in the sense that the pathological changes present and in process of development are inappreciable by our relatively gross clinical methods of approach. Warthin found pathological alterations in latent syphilis with great frequency in various organs, ranging from 30 per cent for the liver to 80 per cent for the testis, and 90 per cent for the aorta. He also lays stress on the presence of these changes in the tissues of treated and presumably "cured" syphilitics, as well as of those untreated.

TABLE II.

THE INFLUENCE OF LATENT SYPHILIS ON THE PRODUCT OF CONCEPTION

		Outcome of Pregnancy Per Cent				
	Total pregnancies	*Child healthy; non-syphilitic*	*Child living; congenital syphilis*	*Died in infancy*	*Miscarriage or stillbirth*	*Induced abortion*
This series.....	1467	16.9	11.1	18.4	48.9	4.5
Jeans's compilation from the literature syphilitic women	2000-4000	16.6	24.0	30.2	30.3	...
Jeans's normal women.....	1712	76.0	....	15.0	9.7	...

It now appears to be accepted that the *Treponema pallidum* passes through a developmental cycle — an active spiral stage with dormant granular alternation. Clinical descriptions of syphilis have concerned themselves with the manifestations found with spirals and a positive Wassermann reaction. The constant association of other clinical states with a history of syphilis compelled the adoption of such terms as "parasyphilis", and "metasyphilis". Here spirals are not necessarily found, nor is the Wassermann reaction often positive. It is probable that these states result from the presence of the granular virus.

History shows a remarkable evolution in the disease. Its virulence, revealed by the high primary mortality of the great European pandemic in the fifteenth century, gradually decreased. Three hundred years later nervous symptoms were first described. Meningitis was first noted by Lallemand in 1834. Within living memory gummata and bone necrosis have

virtually disappeared from the out-patient departments of our hospitals. L. W. Harrison expresses the present opinion thus. "The tendency of syphilis is to become latent so far as outward manifestations are concerned. Animal experiments teach us that syphilitic infection is latent from the first in a definite proportion of cases, so that non-appearance of a chancre is poor evidence of non-infection."

Pathology gives the key to the change. It lies in the increasing power of the body to confine the virus to the lymphatic system, whence, however, it may emerge to attack the host, with the production of either temporary or permanent disability. The peribronchial and mediastinal glands become reservoirs for the storage of spirochætes. Klotz writes "It is from two main lymphatic drainage beds, the thoracic and the abdominal, that the syphilitic virus comes to be distributed to particular segments of the aorta." Carey Coombs summed up the lymphatic hypothesis in these words: "The peri-aortic origin of syphilitic aortitis is recognized. The cellular infiltration that is its distinctive mark wells out of the mediastinal lymphatics in the direction of the aorta, and is piled up on the outer surface of the adventitia." It may not be unreasonable, therefore, on pathological evidence, to attribute nervous dysphagia, nervous dyspepsia, spastic colon, chronic abdominal pain, and the like, in some instances at least, to syphilitic infiltration of the sympathetic nervous system.

Anti-luetic treatment, including the iodides, is often valuable in many conditions other than classical syphilis. The success of such treatment is the basis of the belief that there exist a large number of syphilitics in whom the infection is low grade, the Wassermann test negative, and the spirochætes no longer demonstrable. Kilduffe writes: "The latent syphilitic is as likely as not to seek medical advice for symptoms not at all suggestive of syphilis on their face value; for stomach trouble, vague and ambulatory pains, high blood-pressure, etc., and all too often he receives treatment for just that of which he complains." Stokes and Brown gave details of 200 syphilitics whose main complaint was stomach trouble, with the classical tale of heartburn, belching, pain, nausea, and indigestion. Thirty-five of these underwent needless operation. More significant, from the point of view of this paper, is their statement that during the period of their investigation 50 per cent of the patients admitted to the Mayo Clinic with a diagnosis of neurosis of stomach or functional stomach proved to be latent syphilitics.

It is interesting and important to draw the parallel between infection and disease in syphilis and tuberculosis. There is general agreement, on the basis of routine tuberculin testing and necropsy studies, that approximately 80 to 90 per cent of all adults have developed tuberculous infection. The incidence of tuberculous disease, *i.e.*, the number of patients made ill by the infection, is more difficult to determine, but probably does not exceed 3 to 6 per cent of the population. Thus, there is not more than one chance in fifteen that tuberculosis infection will result in actual disease.

With syphilis, the situation is different. As nearly as can be estimated, about 10 per cent of the adult population has been infected with syphilis. Disregarding as unimportant the lesions of early syphilis, the best available modern studies indicate that of the infected individuals, if untreated, approximately 50 per cent will develop some late lesion, and that in about 25 per cent the late lesion will be partly or wholly incapacitating or fatal. With only one chance in two of freedom from disease instead of the one chance out of fifteen in tuberculous infection, it is obvious that laboratory evidence of syphilitic infection, the positive blood Wassermann of latent syphilis, cannot be lightly dismissed. It must be interpreted to mean not only the certainty of infection but also the probability of disease. A positive blood Wassermann test is a much more portentous finding than a positive tuberculin test. From a prognostic point of view its significance is comparable to a positive sputum.

In contrast to early syphilis, the aim of treatment after the establishment of latency is no longer radical "cure", but rather clinical arrest and the prevention of infection of others.

The question is often asked: Should non-active syphilis be treated at all? Quite substantial reasons why it should be treated have already been given, but if more were needed they may be supplied by a comparison of results in treated and non-treated groups of patients.

The duration of the infection, the passage of time, the sex of the patient, and the occurrence or non-occurrence of pregnancy all influence the

outcome of treatment. The clinical outcome is better in early than in late latency. Distinctly better clinical results are obtainable in females who become pregnant during or after treatment than in females never pregnant.

The heavy metals play a more important rôle in the treatment of latent syphilis than do the arsenicals. Maximum results are probably obtained with about 20 to 30 injections of neo-arsphenamine, combined with large amounts of bismuth, the latter drug being continued over long periods of time. In early latency it is probable that continuous treatment, without rest periods, is preferable. In late latency rest periods are permissible.

It is probably advisable to begin treatment with either mercury or bismuth; in the late cases with mercury, as the mildest of the anti-luetic remedies. The relative therapeutic index of neo-arsphenamine, bismuth and mercury has been estimated as 10 – 7 – 3. Beginning with the mildest tends to minimize the risk of provoking a Herxheimer reaction. Arsenic and the heavy metals may be continued during the first year of treatment, while subsequently bismuth alone may be used. A course of potassium iodide, 20 grains three times a day, well diluted, for 2 or 3 weeks, is a useful adjunct to the therapy and should be given twice a year. The treatment as outlined should be given regardless of serological progress. Cole, and many others, recommend a follow-up course of bismuth yearly for several years.

Regardless of serological response, there is a marked general improvement in the latent syphilitic, even with the milder therapy. It is a common experience for a patient to report, a few weeks after starting treatment, that, although he had not been conscious of feeling bad before, he now feels very much better; he has more energy, tires less easily, has an improved appetite, sleeps better. Such vague discomfort or malaise as he may have had has disappeared. Indeed, he often loogs better, he gains in weight, and his colour is improved. This change represents apparently genuine improvement in the systemic infection and is a sustained gain.

CONCLUSIONS

I feel that this study has demonstrated:

1. That latent syphilis is a matter of very great importance.
2. That previous definite knowledge concerning it has been woefully lacking.
3. That treatment should be carried out in all cases (with the exception of the aged and in those with serious concurrent maladies).
4. That the prognosis is hopeful, and that the results of treatment are extremely gratifying.

A CLINICAL SURVEY OF TWENTY-ONE CASES OF INTUSSUSCEPTION*

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DURING the past twelve years 21 cases of intussusception have been admitted to the Royal Victoria Hospital. These cases form the basis of the present analysis, which brings out several interesting points. The rapid rise in mortality accompanying delay in the relief of the obstruction is very important. Most of the reports on intussusception come from children's hospitals, and so the condition is usually considered to be one of infancy. One-third of the present cases were in persons over 10 years of age, whilst 3 were over 40 years. This comparative frequency in adults is not generally appreciated. The present review also shows the high mortality accompanying resections of the bowel and the need in surgical practice of more persistent effort to reduce the intussusception before proceeding with resection.

Of the 21 patients reported on, 11 died, a mortality of 52 per cent. Emphasis has previously been laid on the important relationship existing between the duration of symptoms and the corresponding mortality rate in small bowel obstruction.[1] In this review the figures are equally striking (Table I). Only one of the patients operated on during the first 24 hours died, a mortality of 14 per cent; the mortality among the remainder averaged 71 per cent.

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Perrin and Lindsay,[2] in an analysis of 400 cases collected from the London Hospital, noted a steady fall in the mortality rate, from 56.7 per cent during the 1903-1905 period to 39.1 per cent in the 1918-1920 group. Even more significant are the figures of Ladd and Gross.[3] In this review of 372 cases from the Boston Children's Hospital the fall was from 59 per cent in the 1908-1912 period to 14 per cent in the 1928-1932 group. Further, during the past five years 60 patients seen and operated on in the first 36 hours of their illness recovered without a death. These figures are startling, and the lessons they convey should be brought to the attention of

TABLE I.

Duration of Symptoms Before Operation	*Number of Cases*	*Mortality Per cent*
0-12 hours	3	0
13-24 hours	4	25
25-48 hours	6	33
Over 48 hours	8	100

every practising physician. First, the mortality is low when the patient comes to operation early; secondly, efforts to reduce the intussusception must be persisted in, and resection avoided if a low mortality rate is to be obtained.

Considering the importance of early diagnosis it would not be out of place briefly to review some of the more characteristic findings found in this condition. Intussusception is commonly described as a condition affecting healthy male infants. In our series there were 13 males and 8 females, 62 per cent and 38 per cent, respectively. Perrin and Lindsay (*loc. cit.*) report a ratio of two to one. Ladd and Gross (*loc. cit.*) report 61 per cent males and 39 per cent females. In this respect the condition is similar to pyloric stenosis and Hirschsprung's disease, though the reason has never been adequately explained.

Intussusception is generally a disease of infancy. Perrin and Lindsay report 78.5 per cent under two years and 70 per cent under one year of age. Ladd and Gross (*loc. cit.*) show 87 per cent under two, and 70 per cent under one. In the present series 57 per cent were under two and 54 per cent under one. If we exclude the cases over 10 years of age, 78 per cent were under 12 months. The majority of cases occur between 5 and 8 months (Table II). In our series 7, or 33 per cent, were over 10 years of age, while 3, or nearly 15 per cent, were over 40 years of age. This fact is generally overlooked, as the majority of reports on intussusception come from children's hospitals.

In regard to the clinical features one cannot

TABLE II.

Age	*Cases*
5 months	1
6 "	6
7 "	2
8 "	1
11 "	1
1- 2 years	2
10-40 "	4
Over 40 "	3

perhaps do better than quote the description of Bolling[4]:

"There is no clinical picture more definite than that of a typical case of intussusception, and, fortunately, the majority of cases are typical. The onset is sudden. An infant, usually between four and twelve months of age, in good health, often breast-fed, screams while nursing or passing a stool, and turns pale. He recovers in a short time, only to cry again and draw up his legs as if in pain. Vomiting frequently follows. The child may then have one or more normal stools, but within a few hours, blood, blood and mucus, or blood mixed with fæces will be passed *per rectum*. After the bowel is emptied blood and mucus alone usually appear. It is important to remember that, at this stage, between paroxysms of pain, there is usually no elevation of pulse or temperature, and the baby may appear little if at all ill. He usually, though not always, refuses to nurse. Occasionally, attention is first drawn to the condition by the passage of a bloody stool. Obstruction is not always complete, and the passage of gas and fæcal matter may continue in the presence of an acute invagination. In the beginning the severity of symptoms is determined by the degree of interference with the circulation. Later the signs of obstruction appear with distension, toxæmia and fæcal vomiting."

In the cases here reported pain and vomiting were present in 95 per cent, a mass was palpated in 52 per cent, while blood in the stools was mentioned in 52 per cent of the cases. The incidence is probably much higher, because, if we exclude the cases in which no mention is made of this finding, there is only one instance in which the stools were negative. Erdmann[5] found no palpable tumour in 60 per cent of his cases, but did not find a single case in which blood was not found, either in the stool or expelled from the anus after digital examination. He thinks most stress should be placed on bloody, or bloody-mucous stools and not on the presence of a sausage-shaped tumour. Ladd and Gross found blood in 88 per cent of their cases. It is our opinion that blood in the stool is a later

symptom, coming on after the circulation has been interfered with. However, it may appear as early as three hours after the onset.

It is important for the physician who is called first not to be misled by the healthy and happy appearance of the child between the attacks of pain. He should wait for an attack which can at times be induced by flicking the abdominal wall. Otherwise, he may be deluded into a false sense of security and thus delay surgical interference, which is life-saving only if performed early. A tentative diagnosis should be made the first time the patient is seen, the history alone being practically sufficient grounds, and the child rushed to hospital. Distension comes later, when gas and fluid collect above the obstruction, and should not be expected in early cases.

When the distension is not too great a mass can usually be felt in the right lower quadrant if sufficient patience in examination is taken. The abdomen should be gently palpated until the child stops crying and the abdominal muscles relax. As the intussusception advances the mass will probably follow the course of the colon. At times it can be felt only after the patient is anæsthetized. Not infrequently it can be felt on rectal examination, as occasionally the intussusception has been reported to have advanced as far as the rectum.

With the progressive vomiting and lack of fluid intake dehydration supervenes, and the drawn, pale facies, with sunken eyes and anxious expression, makes its characteristic appearance. Fever is a late symptom accompanying dehydration, due to changes in the strangulated bowel wall, and, perhaps, the absorption of the decomposed, foul-smelling,bloody large bowel contents. The obstruction may be incomplete, as in chronic, and subacute forms; here the pain is less severe, the vomiting negligible, blood may not be present in the stools, and there is no early shock. The diagnosis is more difficult, but, fortunately, in these cases the need for haste is not so urgent. This type of case appears to be rather rare in infants.

In most cases the use of x-ray studies to assist diagnosis is unnecessary and only makes for delay. Time should not be wasted on such procedures, except in atypical cases or where there is real doubt, when roentgenographic studies are invaluable. In the present series x-ray examination was considered necessary in ten patients and in all confirmed the diagnosis. A barium enema was given in only two cases. A flat plate, with the patient in the erect posture, was all that was necessary in the others. Fluid levels, distended small bowel, with contracted or absent large bowel, and the so-called "ladder pattern" were seen. A barium enema is usually unnecessary, but, when used, will show a definite obstruction to the flow of barium. The barium flows around the apex of the intussusception, giving the well recognized "cupola effect". It also, at times, insinuates itself between the intussusceptum and intussuscipiens, demarcating the former. After the barium has been evacuated this shell of barium remains, outlining the intussusceptum.

Blood chemistry studies show a fall of chlorides and an increase in the CO_2 combining power and urea nitrogen. Operation should never be delayed for chemical investigation.

Types of intussusception.—An analysis of the present series showed that in 7 cases the ileum was invaginated into the ileum (enteric or ileo-ileal type); in 12 cases the ileum passed into the cæcum (ileo-colic); in 1 case the cæcum was invaginated into itself (colo-colic); and, the last case was a double intussusception of the ileo-ileo-colic type. In this type there first occurs an ileo-ileal intussusception, after which, when the ileo-cæcal valve is reached, a second invagination occurs. The importance of this classification lies in its relationship to possible etiological factors.

Pathogenesis. — A study of intussusception shows a ready division into two main groups, *viz.*, those in which the intussusception is accompanied by and apparently initiated by a definite organic lesion, such as a tumour, or Meckel's diverticulum, and those in which no such condition is present. In the present series, Meckel's diverticulum was the apparent cause of the intussusception in 4 cases (29 per cent). One case was caused by a fibromyxoma of the small bowel; another, by papillomata of the small bowel; a third, apparently, by a metastasis of a melano-sarcoma in the mesentery. Another case was due, in the surgeon's opinion, to a congenital persistent mesentery of the ascending colon and a congenital lack of fixation of the whole large bowel (Table III). This is interesting as unusual mobility of the ileum, cæcum and ascending colon is often given as a predisposing cause of intussusception. The majority of ileo-ileal

intussusceptions arise when a tumour or a Meckel's diverticulum is present. In half of the cases analyzed by McIver[6] a definite lesion was responsible for the intussusception. Numerous reports are to be found in the literature where a polyp, carcinoma, or lipoma was considered to be the causative factor. The tumour is pushed down the bowel by the peristaltic waves, its point of attachment being invaginated and forming the apex. Wardill[7] does not accept this commonly held theory, pointing out that in many cases the polyp does not form the apex of the intussusceptum. He supports his contention by operative and museum specimens. He considers that the tumour acts as a foreign body, producing spasmodic contractions of that part of the bowel, with inhibition of the muscles immediately distal to the tumour. Thus, the contracted part slips into the distal part. Lindsay and Perrin[8] noted that in the intussusception of infants there was an inflammation of the lower ileum. Wardill believes that in such cases the mechanism of the ileo-cæcal intussusceptions is similar to those associated with polypi or growths. In the ileo-colic type a definite lesion is rarely present. It is our opinion that the ileo-colic valve, which normally is invaginated into the cæcum, acts as the initiating factor, much as a tumour does in adults.

TABLE III.

TYPES OF INTUSSUSCEPTION WITH THE CAUSE, WHERE KNOWN

Ileo-Ileal Cases	*Ileo-Colic Cases*
Meckel's diverticulum.. 3 Fibromyxoma..... 1 Undetermined cause.... 1	Undetermined cause... 11 Metastases in mesentery of melanotic sarcoma.
Ileo-Ileo-Colic Cases	*Colo-Colic Cases*
Meckel's diverticulum.. 1	Congenital persistent mesentery of ascending colon and congenital lack of fixation of large bowel.. 1

It has frequently been stated that intussusception follows dietary indiscretions in children. This observation has not been generally confirmed. The frequency of intussusception in infants suggests that the infantile cæcum, which is funnel-shaped, tapering down to the ileo-colic valve and appendix plays some part in the initiation of the condition. Pyloric stenosis, also a disease of infancy, more common in males, shows a definite thickening of the pyloric valve. During infancy instability of peristaltic control is more marked. It is suggested that the ileo-colic variety of intussusception in infants is due to active peristalsis of the small bowel, acting against an infantile cæcum with spasm, or hypertrophy of the already invaginated ileo-cæcal valve. This acts as a foreign body, much as a Meckel's diverticulum or tumour acts in the case of most ileo-ileal intussusceptions. In a case reported by Herbert[9] there was an intussusception of bowel into the stomach after a gastro-enterostomy; here the stoma acted as a constricting band. Richdorf and Hayes[10] reported a double intussusception in which the transverse colon was constricted by a loop of jejunum. An ileo-colic intussusception had occurred proximally to the partially obstructed point, and a retrograde colo-colic intussusception took place distally, the descending colon telescoping into the transverse colon. In this case there was unusual mobility of the colon, the mesentery and meso-colon being unusually long. Here retrograde peristalsis evidently caused a retrograde intussusception. Experimentally, Britton[11] made an observation which suggested that bowel irritability, and perhaps deranged autonomic nervous control, may initiate an intussusception. In studying the adrenal responses of a male cat to cold he denervated the heart and liver. He then gave the animal 90 c.c. of ice water (temperature 0.7° C.) by stomach tube. A few days later the cat exhibited all the signs of acute small bowel obstruction and died on the fourteenth day. Autopsy revealed an ileo-ileal intussusception in which the greater portion of the intussusceptum was gangrenous. He suggests that ice water induced a hyper-peristalsis to such an extent as to bring about a severe derangement of normal function. Fraser[14] suggests that disturbed relationship between the sympathetic and parasympathetic may underlie the formation of an intussusception. Thus while much is already known about the causation and mechanism of intussusception the final word has not been written. There is probably no single cause.

Treatment.—Though early diagnosis and early treatment are such important factors in reducing the mortality, improvement in the type of treatment during recent years has also played a large part in the lowering of the mortality rate. Re-

section should never be performed if it can possibly be avoided. C. W. Mayo and J. R. Phillips[12] state that resection carries a mortality of 90 to 95 per cent. Of the 10 living cases in our series all were reducible. In 2 resection was also carried out, one because the bowel did not appear viable; the other in an adult because of the presence of a tumour of the small bowel. In the 11 patients who died, 5 cases were reducible. In three of these an ileostomy was also instituted because of the distension of the small bowel and the danger of the severely damaged portion continuing to obstruct the lumen. In another case, though reducible, the bowel perforated and the patient died of peritonitis. One child, moribund on admission, died without an operation. In 3 cases requiring resection because they were irreducible all the patients died. Finally in 2 cases in which an anastomosis was made between the ileum and sigmoid, the intussusception being brought into the wound, both patients died.

It is thus evident that reduction alone gives a good chance for recovery, but this is possible only in the earlier cases. When the bowel becomes strangulated it is thickened and friable; reduction is difficult. However, efforts at reduction should not be lightly abandoned. The receiving ring should be carefully and slowly stretched with a vaselined finger, and some of the œdema overcome by gentle pressure. The intussusceptum should not be pulled out because if the bowel is friable there is the danger of rupture. The mass should be taken in the hand and gently but firmly milked back. The mass should be left in the abdominal cavity, or well covered with hot, saline compresses.

The fine results of the cases treated at the Boston Children's Hospital[3] in which 60 recent early cases were treated without a death, warrants a careful review of the methods used. Attempts at reduction have been persisted in longer than was formerly thought wise. Eighty-three per cent of the cases were reduced. In addition, the ileum was drained when the viability of the intestines appeared doubtful. In some instances a Meckel's diverticulum was excised, although if this appears viable it is probably wise to leave this excision for another time. The rule should be to do the least possible at the emergency operation. It is often unbelievable how much recovery a damaged bowel can accomplish. A glistening bowel, no matter how damaged it appears, should be replaced. Resection in such cases, especially in infants, is almost invariably fatal, while recovery of the damaged bowel is the rule.

Some years ago non-operative methods of reduction were advocated. This consisted of manipulation of the mass together with colonic enemata. Anschutz[13] points out that while disinvagination has had a mortality of 6.6 per cent, operation on the failures showed a mortality of 87 per cent for children under two years. Non-operative treatment is unsatisfactory; it delays operation and should not be attempted. Since reduction at operation is frequently difficult or impossible, non-operative treatment is bound to be uncertain. It is of interest, however, that in the series referred to by Anschutz 45 cases out of 63 were reduced without operation, and only two patients died.

Ether is the anæsthetic of choice for children; spinal anæsthesia or a general anæsthetic is satisfactory for adults. A right paramedian incision is the most satisfactory, as it gives good exposure. If the intussusception is irreducible it may be advisable to bring the tumour out of the abdomen and resect, leaving a double enterostomy. Distended, œdematous bowel is poor material with which to do a primary anastomosis. The object of the operation is to save life, all other considerations are of secondary importance.

When dehydration is present the best procedure is to commence intravenous saline drip in the operating room. Pre-operative intravenous salines only delay the operation. The best rule to adopt is not to allow anything to delay the reduction of the intussusception.

SUMMARY

A survey of 21 cases of intussusception occurring at the Royal Victoria Hospital has been presented. The cases that were operated on during the first twenty-four hours carried the lowest mortality rate. Early diagnosis and immediate operative interference is imperative if the death rate is to be lowered. Skiagrams were characteristic, but are only necessary in the minority of cases. A brief review of the symptomatology and a discussion of the pathogenesis has been presented. Resection carries a high mortality rate; attempts at reduction should be persisted in first.

Since writing the above an interesting condition has been observed by one of us (G.M.). Following the removal of an appendix for acute appendicitis in a boy of three, the lower two feet of ileum were examined to note the presence or absence of a Meckel's diverticulum as is our routine. About eight inches proximal to the ileo-cæcal valve, an intussusception was found to be present. There were no circulatory changes. The bowel above this point was relaxed and thin walled. Distal to the intussusception the bowel was irritable and tended, on handling, to form constricted bands due to ring contraction of the muscles. The intussusception was about two inches in length and was reduced as soon as the proximal loop was picked up in the fingers. This brought to mind experimental observations by others on cats and dogs where transient intussusception seems to occur in response to hyperperistalsis and to be reduced spontaneously. The bowel in small children is not only thin walled but quite often contains air, thus differing from that of the adult. It seems probable that in this type of case may be found the explanation of those cases of intussusception in which no organic causative lesion can be found at the point of intussusception. A degree of intussusception can occur within physiological limits in infants. If this, by unusual peristalsis becomes too extensive, automatic reduction fails to occur, and a pathological intussusception develops.

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HYSTERECTOMY

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GIACOMO BERENGARIO DA CARPI,[1] over three hundred years ago, did the first vaginal hysterectomy. We know that this operation was not a complete extirpation, but there is no record of the technique in this interesting case. It was a bold attempt to deal with a carcinomatous condition, and encouraged other surgeons, until, finally, Cruce reported complete removal by the vaginal route. Those early operators picked their subjects and chose cases of carcinoma in which there was considerable procidentia uteri. No systematized technique was practised or taught until Sauter performed the first removal *in situ*. As is to be expected, this caused considerable interest and the operation soon was performed successfully by a host of surgeons. For a long time the mortality rate, according to our present standards, was notoriously high; yet for a long time it continued to be considered a very satisfactory way to deal with carcinoma and procidentia.

This still limited the operation to a certain number of cases, until finally, in 1838, Freund[2] performed the first abdominal hysterectomy. This stimulated great interest and opened a much wider field for uterine surgery, as now large fibroids could be treated. The wave of enthusiasm for abdominal hysterectomy spread and it was soon preferred to the vaginal route. In fact, vaginal hysterectomy was almost abandoned. It is interesting to note that the technique as advised by Freund does not differ in essentials from our present-day operation. At a later date the covering of the stump with flaps of peritoneum was added, and more attention was paid to the anchoring of the broad and round ligaments to the cervical stump. This operation largely supplanted the older method until thirty years later, in 1870, when Czerny recognized that there was a group of cases which could be dealt with without abdominal section. He reverted to the older operation, and again made vaginal hysterectomy popular as the operation of choice in carcinoma and procidentia.

On this continent, J. C. Warren performed the first vaginal hysterectomy in 1829. Fenger in 1882 collected and reported a large number of cases, describing in detail the operative procedure. He enunciated the indications for the operation as (1) carcinoma; (2) prolapse; (3) inversion.

Late in the nineteenth century and during the

early part of the present there was a wave of enthusiasm for pelvic operations as a cure-all for many of the functional disorders of women. The uterus was not spared in this onslaught, and Henrotin, in 1891, after having successfully removed an infected uterus, laid down the following as indications for hysterectomy.

1. Normal uterus.
   (a) Neurasthenia. Insanity.
   (b) Dysmenorrhœa. Metrorrhagia. Pelvic pain.
   (c) Prolapse.
2. Carcinoma in old or fat women where uterus is not too large.
3. Fibroids which are small enough to be delivered in this way.
4. Gangrenous or infected uterus with suppuration of the appendages.
5. Metritis with chronic salpingitis, tuberculosis, peritonitis, etc.

We have learned a great deal since that time, and few of the above conditions would be considered well treated by vaginal hysterectomy today. The application of plastic surgery, the use of radium and hormone therapy, while more conservative, have also been more rational. A greater understanding of neuro-psychopathic diseases has prevented many useless operations. Plastic surgery has modified the treatment of the earlier case of prolapse. Radium has relieved or temporarily controlled many of the cases of metrorrhagia, and hormone and endocrine therapy, while still in the experimental stage, bids fair to be a boon to sufferers from dysmenorrhœa. Even the first stronghold of this operation, namely carcinoma, has yielded to radium and pan-hysterectomy. Our present-day knowledge restricts this operation (1) to procidentia in women past the menopause, and (2) to carcinoma in very old patients where a more radical operation would be unwise.

Abdominal hysterectomy, as stated previously, was first done by Freund in 1838. He established and described a routine procedure. This created a widespread interest and extended the scope of pelvic surgery. Surgeons were slow to diagnose and treat fibroids, and it was fifteen years later, in 1853, that Kimball diagnosed and operated on a case of fibroid tumour. This added greatly to the popularity of the operation and soon abdominal hysterectomy was being performed by many surgeons. The mortality ranged from 50 to 80 per cent. Freund's technique was the one followed, but from time to time it was embellished with additions. Hagar in 1879 cauterized the stump and stitched the peritoneum around it; Goff in 1890 covered the stump with two flaps of peritoneum.

Abdominal hysterectomy is largely the operation of choice today in the case of (1) large fibroids; (2) carcinoma of the body of the uterus, and (3) chronic inflammatory disease of the uterus and appendages.

At the present time this operation presents a number of controversial points. Gynæcologists are not unanimous that subtotal hysterectomy is sufficient in the case of benign tumours of the uterus. Many advise and practise pan-hysterectomy here. They argue (1) that the danger of the development of carcinoma of the cervix justifies the major procedure; (2) that the continuance of a local discharge is very annoying to these patients, and can only be permanently dealt with by total extirpation. On the other hand, exponents of the more conservative operation of subtotal hysterectomy believe that it is the better treatment because there is (1) lower mortality; (2) shorter and smoother convalescence with less likelihood of troublesome complications; (3) less danger of prolapse of the vaginal vault; and (4) the danger of carcinoma of the cervix developing later is very much exaggerated. It is difficult to get reliable follow-up reports to determine the frequency of its occurrence. Gardner[3] quotes from the records of the Johns Hopkins Hospital and St. Luke's, Chicago, and cannot satisfy himself that it is so very frequent. However, some cases of cervical carcinoma did develop in patients who had had a subtotal hysterectomy. This is to be expected, but the increased operative mortality following the pan-hysterectomy would more than offset the security obtained. There are, however, cases of badly diseased cervix which if not relieved will be a continuous annoyance to the patient. These cases are suitable for pan-hysterectomy.

The fate of the ovaries at the time of operation has recently been given a great deal of attention. Many gynæcologists believe that ablation of the ovaries is the soundest surgical procedure, as they soon cease to function after the destruction of the endometrium and degenerative changes are so likely to follow hysterectomy. The vasomotor disturbances following hysterectomy in women who are actively

menstruating have long been recognized as distressing. Whether these symptoms are influenced by the course of treatment is difficult to determine precisely. Sessimus and Murphy[4] in a study of a series of cases advise conservatism, as they found menopausal symptoms less marked when the ovaries were retained. This appears logical and is a reasonable course to follow until we have a much better understanding of endocrinology. The degenerative changes which were supposed to occur in the ovary following hysterectomy seem to me to be over-emphasized. Damage to the blood supply was considered to be the cause of this, but in spite of this we saw very few cases necessitating further surgical treatment. Sessimus and Murphy,[5] using rabbits as experimental animals to determine the influence of the endometrium upon the ovary after hysterectomy, report that the destruction of the endometrium, rather than the circulatory damage, produces the degenerative changes; also that the endometrium elaborates a hormone which influences ovarian function.

The study of the following cases was undertaken to determine what was the wisest and safest procedure to follow. Is subtotal hysterectomy sufficient in fibroids? Should the ovaries be removed as a routine procedure, regardless of condition or age? Should the surgeon exercise his judgment in determining what should be done? It was because of these controversial points that I reviewed a number of case reports to see if they would give any useful information.

In all 268 case reports were reviewed and questionnaires sent to all but 11 patients known to be dead. Replies were received from 152, and only these cases are used in reviewing the results.

The technique of the operations did not differ from that usually employed. Certain principles were fairly constantly adopted, as (1) preliminary sterilization of the vagina and cauterization of the cervix; (2) leaving the ovaries in cases of benign tumours, except when obviously diseased.

AGE

The average age of the whole group was 45.05 years; the youngest 26 and the oldest 67. It is interesting to note the number of patients operated on under 40 years of age; in fact, there were 10 under 30 years. Sixty-two patients were under 40 years, and only 88 out of the 268 had passed the menopause.

Total number of patients	268
20 to 30 years	10 or 3.7 per cent
30 to 40 years	52 or 19.8 per cent
40 to 45 years	78 or 29.1 per cent
45 to 67 years	128 or 47.4 per cent

SYMPTOMS

Bleeding.—As one would expect, uterine bleeding was the commonest complaint in the group. The bleeding was not necessarily profuse, but was sufficiently abnormal to make the patients seek aid. One hundred and forty-four, or 53.7 per cent, came with this complaint.

Tumour.—Fifty-one, or 19 per cent, of the patients discovered that they had a tumour, and, usually fearing new growth, came for relief or advice. It is astounding that large fibroids can exist without patients being aware of anything abnormal, and they may live for long periods in total ignorance of an abdominal tumour.

Pain.—Forty-two, or 15.6 per cent, of the patients came complaining of pain in the lower abdomen. This pain is usually dull in character, is referred either to the back or one side, and is worse when the patient is standing for long periods, and during menstruation.

Prolapse.—Most of these patients had severe degrees of procidentia before consulting a surgeon. In a number there was complete prolapse, with excoriation and ulceration of the cervix. The fear of cancer was responsible for many seeking aid. Twenty-seven women, or 10 per cent, came complaining of the usual symptoms of prolapse.

Urinary frequency.—It is strange that large pelvic tumours can exist without producing any bladder symptoms. Many of these were nodular or intra-ligamentous tumours and yet only 4 patients, or 1.5 per cent, complained of bladder symptoms.

Bleeding	144 or 53.7 per cent
Tumour	51 or 19.0 per cent
Pain	42 or 15.6 per cent
Prolapse	27 or 10.0 per cent
Frequency	4 or 1.5 per cent

DIAGNOSIS

Uterine fibroids provided the largest number of cases, 176, or 65.7 per cent. These cases were selected for surgical treatment because of the size or multiplicity of the tumours, or because of the age of the patient. Young patients, when

practicable, had myomectomy. No mention is made here of these cases.

Arteriosclerosis. — Thirty-nine, or 14.5 per cent, were diagnosed as arteriosclerosis. This study includes operations done in 1922. It is probable that many of these patients would be treated by radium today.

Prolapse.—This was the third largest group, and 27 cases, or 10 per cent, belonged to this class.

Carcinoma of the body.—Eighteen patients, or 6.7 per cent, of the series were suffering from adenocarcinoma.

Carcinoma of the cervix.—In this class there were only 4 cases, or 1.2 per cent. This shows the trend away from surgery to radium in these cases even as early as 1922. None were treated surgically later than 1926.

Sarcoma.—Two cases of sarcoma were treated. These were cases of myosarcoma and had been fibroid tumours which had undergone malignant change.

Inflammatory.—Tuberculosis and endometriosis each provided a case. An extremely conservative view has been entertained concerning chronic disease of the appendages, and the uterus, with at least part of the ovary, has been left in nearly all the cases.

Fibroids	176 or 65.7 per cent
Arteriosclerosis	39 or 14.5 per cent
Prolapse	27 or 10.0 per cent
Cancer of body	18 or 6.7 per cent
Cancer of cervix	4 or 1.2 per cent
Sarcoma	2 or 0.8 per cent
Inflammatory	2 or 0.8 per cent

TYPES OF OPERATION

There were 231 abdominal and 37 vaginal hysterectomies. Subtotal hysterectomy was the operation of choice in fibroid tumours. The cervix in many cases was well cauterized at time of operation, and pan-hysterectomy was done only if the cervix was grossly diseased. The destruction of the endometrium, as done by coning out the cervix, is of questionable merit, as shown by the work of Sessimus and Murphy.

Subtotal hysterectomy .	195 or 72.7 per cent
Pan-hysterectomy	36 or 13.4 per cent
Vaginal hysterectomy ..	37 or 13.8 per cent

The ovaries, if not diseased, were left in all cases of benign tumours. This has been followed consistently except in some of the older patients. Cystic disease or inflammatory conditions were considered sufficient to warrant removal of one or both ovaries. Both ovaries were removed in 41 cases, and one ovary in 15 cases.

Both ovaries removed ..	41 or 15.2 per cent
One ovary removed	15 or 5.5 per cent

The study of the results of these operations is confined in all to 152 patients, from whom replies were received when questionnaires were sent, and 11 known to have died. It is possible that there have been more deaths than are recorded in this study, as it covers a period of ten years, 1922 to 1932.

MORTALITY

Five patients died after operation. These deaths all occurred within five days. Three cases were diagnosed as cardiac deaths, one as shock, and one as renal insufficiency following operation for concealed hæmorrhage. This mortality was confined to cases in which pan-hysterectomy had been done. There was no mortality in either subtotal hysterectomy or vaginal hysterectomy.

Total number of cases .	268
Total deaths	5 or 1.8 per cent
Subtotal hysterectomy .	0 or 0.0 per cent
Vaginal hysterectomy ..	0 or 0.0 per cent
Pan-hysterectomy	5 or 13.8 per cent

Six of the patients died later from the disease for which they had sought treatment. They were all suffering from malignancy. The fatal termination in the sarcoma cases was much more rapid than in carcinoma. One patient lived eighteen months, the other nine months; both died from extension of the disease. Two patients with adenocarcinoma died, one two and a half years and the other two years after the operation, the former with extension of disease in the colon, and the latter with gastric involvement. Two of the four patients with carcinoma of the cervix, upon whom hysterectomy was performed, are known to be dead. One is alive and apparently free from the disease; no reply was received from the other. One died two years and the other four years after the operation, the former from carcinoma of the rectum and the latter from extensive secondaries. Adenocarcinoma presents a more favourable picture in the 18 cases treated surgically. Replies were received from seven, all of whom reported that they were in good health. In one of these cases

nine years had elapsed, and in the others one to four years.

NERVOUS SYMPTOMS

Vasomotor disturbances following hysterectomy have been the most frequent and distressing complaint. No attempt was made to compare cases with and without removal of the ovaries, as most patients in whom oöphorectomy was performed were past the menopause. In all, 33 patients replied complaining of hot flushes, and four were quite emphatic about the severity of these.

Total number of cases .	152
Moderate nervous symptoms	29 or 19.0 per cent
Severe nervous symptoms	4 or 2.6 per cent

PROLAPSE

Prolapse of the vaginal vault or cervix following hysterectomy is very disconcerting and happens occasionally. Moderate degrees of prolapse are borne without any complaint. When it is complete, however, it usually produces some discomfort. There were three cases of prolapse, two of which required secondary operations for relief, and one was severe enough to warrant some surgical treatment. Two of these cases followed total, and one subtotal, hysterectomy. Of the 152 patients who reported, 128 had had subtotal and 24 total hysterectomy. The latter included vaginal and pan-hysterectomy. This shows the greater liability of prolapse following total hysterectomy, the ratio being eleven to one.

Total number of cases .	152
Prolapse	3 or 1.9 per cent
Subtotal hysterectomy .	128
Prolapse	1 or 0.7 per cent
Total hysterectomy	24
Prolapse	2 or 8.0 per cent

MENSTRUATION

When subtotal hysterectomy is performed on young patients and oöphorectomy is not done, menstruation sometimes continues regularly for some time. The flow is quite scanty, but has a good psychological effect on the patient. Three patients reported that there was slight menstruation. One, who was forty years of age at the time of operation, menstruated for two years; the other two were still menstruating irregularly two and three years after the operation. One woman complained of a troublesome leucorrhœal discharge.

CARCINOMA OF THE CERVIX

Carcinoma of the cervix has been known to develop in the cervical stump following subtotal hysterectomy. It is difficult to get any reliable data on the frequency of this occurrence. One patient came back one year after subtotal hysterectomy with fairly advanced carcinoma of the cervix. I reviewed her history and believe that the disease was present at the time of the first operation, but was overlooked. Presuming that all patients who develop carcinoma of the cervical stump die from the disease, I believe that the mortality will be less than that which will follow pan-hysterectomy.

CONCLUSIONS

1. Subtotal hysterectomy is a satisfactory operation for uterine myomata.

2. There is greater mortality in pan-hysterectomy than in subtotal hysterectomy.

3. Leaving healthy ovaries after subtotal hysterectomy does not appear to be followed by any serious consequences.

I am indebted to the late Dr. F. N. G. Starr and to Dr. R. V. B. Shier for permission to use their case reports in this study.

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EFFECT UPON THE FETAL HEART OF CIGARETTE SMOKING DURING PREGNANCY.—Sontag and Wallace base their inquiry upon the work of Tonn, who found nicotine in the milk of mothers whose infants showed evidence of nicotine poisoning. They take it as agreed that nicotine increases the heart rate in adults. Timing fetal heart-beats in counts of ten, with two observers simultaneously, they obtained records whose curves showed them to be statistically reliable. The average increases in fetal heart-beats amounted to 5 per minute, showing that nicotine passes the placenta. As the difference in rates before and after smoking is more than twenty-five times the probable error of the difference, the effect of smoking is actual. The authors consider that evidence of injurious effects of smoking during pregnancy may be overlooked in the offspring.—*Am. J. Obst. & Gyn.*, Jan., 1935, p. 77.

TUBERCULOSIS IN CHILDHOOD*

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IT was formerly assumed that were adult tuberculosis adequately controlled through early diagnosis, isolation, education and training, infection would rapidly diminish and childhood tuberculosis would take care of itself. Efforts were therefore directed to the control of adult disease and were rewarded with a gradual reduction of mortality in both adults and children. But progress has not been rapid enough to satisfy an impatient age, and the probability of final success seemed too remote to justify continued reliance on these efforts alone. We have come to despair of early diagnosis and even to doubt the importance or the existence of the early closed adult lesion, classified as minimal disease. From past experience and increasing knowledge concerning the evolution of tuberculosis, many have now reached the conclusion that only by the adoption and vigorous application of preventive measures in infancy and childhood can we hope to control the disease in adult life. The appeal of the child and the promise of greater progress towards control in adults has created a demand for increased attention to tuberculosis in childhood and many plans have been proposed. Those of us who direct the activities of the sanatoria and clinics must choose the measures to be adopted. What measures shall we advise and what may be the results to be expected? Some general observations from the literature and from personal experience which may influence decision are presented in this paper.

Wherever we turn for guidance, whether it be to text-book, mortality tables, current literature, or the multiplicity of schemes proposed or initiated in centres in our own or foreign countries, we find contradictions and confusion. The childhood tuberculosis of the text-book is still a serious disease with a grave prognosis. The chief characteristic is its tendency to become generalized throughout the lymphatic system and to terminate in the acute miliary or meningeal form, bronchopneumonic or disseminated tubercle. Universal infection in the later years of childhood is questioned, but a high incidence, steadily increasing with age, is accepted and the prognosis in the first two years of life is almost hopeless. That this is not childhood tuberculosis as found in our sanatoria and clinics will be shown as we proceed, but should we attempt to form an opinion from a study of mortality statistics we will find little in such a text-book description with which to disagree.

The average annual mortality figures for certain age groups, calculated from the records of the Canadian Bureau of Statistics for the years 1928 to 1932 inclusive are presented in Tables I and II. Approximately one-seventh of all deaths from tuberculosis occur in the first fourteen years of life, but of these respiratory disease accounts for only one-twelfth of the total, while four-fifths of all meningeal deaths occur in this age group. In the succeeding five-year period, meningeal deaths fall to less than one-tenth of the total for all ages. The ineffectiveness of treatment for this form renders any reduction in mortality dependent on prevention of infection, or perhaps reinfection, presumably from adult sources. In the distribution by years, the figures for the second, third and fourth years are significant, applying to the pre-school age. This age has assumed great importance and receives a major share of attention in clinics and in schemes proposed, attention which can only be warranted by a predicted reduced mortality in later years, the proof of which rests with the future.

Turning to current literature, we will find that clinical studies disregard mortality figures and the fatal disease of the text-book, but attempt to follow the course of the disease in the living and apparently healthy child. These studies, broadly speaking, follow two avenues of investigation, the first attempting to unfold the mysteries of primary infection or subsequent re-

* A paper read at the Annual Meeting of the Canadian Tuberculosis Association, Montreal, June, 1934.

infection in relation to disease and its prevention, while the second strives, through intensive study and repeated observation of lesions which can be demonstrated, to determine their evolution *in vivo*, the prognosis, the relation to infection or re-infection, to environment, and, finally, to disease in adult life.

Further investigation of these contact children to determine the presence of demonstrable disease gave the results shown in Table IV.

The higher incidence of both active (not yet healed) disease and healed disease in the bacillary contacts is evident, and suggests a fertile readily available field for the discovery of child-

TABLE I.

TUBERCULOSIS MORTALITY IN CANADA

Yearly Average 1928-1932

	All Ages			*Birth to 14th Yr.*			*15th to 19th Yr.*		
	M	*F*	*Total*	*M*	*F*	*Total*	*M*	*F*	*Total*
All forms	3725	3963	7688	565	587	1152	292	527	819
Respiratory	3029	3282	6311	240	303	543	230	446	676
Meninges and Central Nervous System	286	269	555	211	197	408	23	26	49
Other organs	410	412	822	114	87	201	39	55	94

TABLE II.

MORTALITY IN CHILDHOOD

	Under 1 Yr.		*1 Yr.*		*2 Yrs.*		*3 Yrs.*		*4 Yrs.*		*5-9 Yrs.*		*10-14 Yrs.*		*Total*	
	M	*F*	*M*	*F*	*M*	*F*	*M*	*F*	*M*	*F*	*M*	*F*	*M*	*F*	*M*	*F*
All forms	108	90	80	70	50	40	42	40	30	34	134	110	121	193	565	587
Respiratory	40	34	30	32	20	17	16	16	10	12	51	58	73	134	240	303
Meninges and Central Nervous System	45	41	37	27	20	19	19	18	13	16	52	48	25	28	211	197
Other organs	23	15	13	11	10	4	7	6	7	6	31	4	23	31	114	87

Regarding the extent of infection in childhood, as shown from tuberculin-testing large numbers of children in many areas, while wide variations in the percentages found to react positively have been reported and are not easily explained, it has been demonstrated that for Canada it is relatively low, far short of the 75 to 90 per cent that was formerly accepted. It has also been demonstrated that children in contact with open or bacillary cases show a much higher proportion of positive reactions than a similar group of non-contacts with non-bacillary cases. Our own experience with children belonging to these groups is shown in Table III.

TABLE III.

INFECTION IN CHILDREN

	Examined	*Reacted*	*Later*	*Total*	*Per cent*
Bacillary Contacts	327	225	11	236	72
Non-bacillary Contacts	81	10	1	11	23

NOTE.—Parke-Davis Co., Old Tuberculin used, diluted in saline 0.1 c.c.—0.1 mgm., intracutaneously—followed if negative by 0.1 c.c.—1 mgm. Non-reactors retested in six to twelve months.

hood tuberculosis. But if the majority have already successfully handled their infection under unfavourable conditions, what indication is there that the minority with disease not yet healed will require any assistance in reaching the same satisfactory position?

It would seem that whatever active supervision or treatment is proposed for children who react to tuberculin, with or without demonstrable lesions, must be largely based on the assumption that childhood infection, successfully handled, will confer sufficient immunity to protect during adult life. But in recent years many investigators and students have questioned the adequacy

TABLE IV.

DISEASE IN CHILDREN

	Examined	*Active Disease*	*Healed*	*Total*
		Per cent	Per cent	Per cent
Bacillary Contacts	327	39 (11.6)	60 (18.35)	99 (30)
Non-bacillary Contacts	81	0	2 (2.4)	2 (2.4)

of this protection and even the belief that immunity can only be acquired through infection. It is argued that the adult type of disease which develops in allergic individuals is a much more fatal type than the so-called primary or childhood type of lesion, whether it develops in childhood or in later years. First infection, or its first demonstrable manifestation as a lesion in the lung, produces a benign type of disease at any age. From our own observation of a group of children, over a period of years, we agree that the course is usually benign; healing is slow and without appreciable disturbance of health. If this be true, shall we strive to prevent infection, to keep the tuberculin test negative not only in childhood but throughout life, or shall we aim at complete protection during infancy but welcome infection thereafter so long as it does not overwhelm the gradually increasing immunity? If we choose the latter alternative, shall we depend on natural infection or should we advocate active immunization by BCG or other means?

In the study of lesions demonstrable in childhood we shall find still further confusion. The intrathoracic lesions demonstrable by radiography have been divided and subdivided until one is no longer dealing with one disease but with a considerable group of disease which have only one common factor, the tubercle bacillus. The lesions may be primary or of entirely different behaviour because of sensitization by earlier infection. They may be single or multiple, localized or disseminated, latent or manifest, recessive or progressive, juvenile or adult, glandular or pulmonary. They are said to differ in origin, symptoms, x-ray appearance, course and termination, to require different treatment, and to have variable significance concerning immunity or the development of adult tuberculosis. A lesion at an apex or the hilus differs in evolution and prognosis from epituberculosis or an infraclavicular lesion. Amidst all the confusion it is difficult to choose a course of action which will meet the needs of the sick child and the larger objective — control in all age periods.

Tables V and VI which follow, compiled from the records of 111 children discharged from the children's wards of the Royal Ottawa Sanatorium, will serve to illustrate the importance of contact with bacillary cases, the variety of lesions encountered, and the difficulties in the way of diagnosis and prognosis. Parental infection stands out in Table V, which also supports the view that the triad upon which we must rely for diagnosis is contact, tuberculin, and x-ray. Under diagnosis in Table VI the absence of meningeal tuberculosis and of acute and progressive disease in any form is striking in comparison with mortality statistics for this age group. It is doubtful if our case finding and treatment of the disease in childhood makes any impression on the mortality or morbidity in childhood indicated in vital statistics. The condition of the lesion on discharge after an average period of one year is comparable in some respects to the healed or healing lesions found in contacts. One may hazard the opinion that an equally large percentage of these lesions would go on to healing and calcification without institutional treatment.

There remains for discussion the fate of these children treated with apparent success when they reach adult years, but before the answer can be given many years of continued observa-

TABLE V.

CHILDHOOD TUBERCULOSIS

111 ADMISSIONS TO ROYAL OTTAWA SANATORIUM

Ages	*M*	*F*	*Contact with Tb.*		*Admission Findings*		
						Positive	Negative
Years							
1 ...	2	4	Father.....	27			
2 ...	5	4	Mother.....	25	Symptoms.	45	56
3 ...	6	5	Both Parents..	5	Tuberculin	100	11
14 ...	4	3	Bro. or Sister..	17	Physical		
5-9 ...	18	32	Parent and		Signs...	31	80
10-13...	12	16	Child.....	11	X-Ray....	75	36
	—	—	Other.....	16			
	47	64	None.....	31			

TABLE VI.

CHILDHOOD TUBERCULOSIS

111 ADMISSIONS TO ROYAL OTTAWA SANATORIUM

Diagnosis		*Condition on Discharge*	
Suspect.....	27	*Clinical:*	
Tuberculosis Pulmonary:		Excellent.....	85
Br-Pn.....	1	Satisfactory.....	12
Apical.....	20	Improved.....	9
Basal.....	17	Unimproved....	3
Hilar.....	35	Failed or Died..	2
Adult.....	3		111
Pleural.....	3		
Glandular.....	31	*Anatomical:*	
Other glands.....	7	Cured.....	37
Bones—Joints.....	3	Improved.....	38
Other organs.....	3	Unchanged.....	11
Multiple.....	3	Progressed.....	2
Non-tuberculous Disease	27	No Lesion.....	23
PhysicalDefects	64		111

tions must elapse. Two of these children developed lesions of the adult upper lobe type within two years after discharge in excellent condition and with a negative x-ray. A similar development has occurred in a girl of thirteen years after almost one year in residence. One small girl with barely demonstrable hilus involvement died from meningitis within one year after returning to a home in which an unrecognizable open case was living. Impressions from a limited experience are of little value, but certainly the protection fails at times under conditions more nearly ideal than the best possible in the average home.

The children with whom we are primarily concerned belong in one of three groups, those who are ill with tuberculosis, those with demonstrable lesions who are not now and may never be ill, and those without demonstrable lesions or illness who have been in contact with open tuberculosis, whether or not they react to tuberculin. Until we have adequately dealt with these three groups there is no justification for encroaching further upon the field of public health in childhood, except for investigation or demonstration in a limited way.

The child who is ill with tuberculosis requires sanatorium treatment or its equivalent. For the child with a demonstrable lesion, but with no sign or symptom of illness, the indications are less clear. In our own series 60 per cent had handled their lesions perfectly without any treatment, and more would undoubtedly have done so, given sufficient time. On the side of prevention, groups two and three require supervision and re-examination at intervals, but the positive indication is to protect them from continued exposure and re-infection. To enroll these children in open air schools, nutrition classes, summer camps or preventoria without removing the source of infection from the homes is sheer waste and stupidity.

The story of tuberculosis in childhood, its evolution, its relation to disease in later life is being rewritten. Until it emerges from the realms of speculation and confusion where it rests at present there is need for conservatism in promises made, time and money expended, and schemes launched. Whether or not adequate immunity can be acquired under controlled conditions is still a subject for debate, but it is an accepted fact that the child or adult completely protected from invasion by the tubercle bacillus will never become ill with tuberculosis. One sure way to reduce childhood tuberculosis is to diagnose, isolate, and treat the adult carrier of infection. Let us treat the child who is ill, supervise those with lesions or known exposure who are not ill, but first and always search out and deal with the source of their infection. These are the fundamentals which are sound in theory, capable of practical application, and certain to produce results.

"To succeed one must make good. To fulfil the tenets of his calling, a doctor must diagnose diseases accurately and cure his patients. To accomplish this he must have knowledge. To possess knowledge of the science of medicine he must familiarize himself with the achievements of the most competent doctors; he must make frequent visits to the masters of surgery and witness their work; he must visit his confrères in other lands; he must know by comparison how nearly right he is, measured by the standards of his peers. When he discovers or achieves something that all medical men should know he must be unselfish enough to present it at medical meetings, and to publish it in medical journals. He must learn to talk, and he must learn to write — all of this that every patient may be benefited by every advance in medical science. His best friends should be his associates in medicine, his scientific books, and the people of all classes who come to him for aid. His recreation should be a change of work, and devotion to his calling should be his greatest pleasure.

"He cannot serve two masters — society and his profession. He must learn to think. He must practise economy. He must practise medicine as a profession and not as a business. Rich and poor are afflicted with similar diseases, and he must treat them with equal care and with equal faithfulness.

"If a doctor makes a mistake he must endeavour not to make the same mistake twice. If he is criticized let him make sure that he does not deserve it. If he is misjudged by honest critics, let him endeavour to correct the misunderstanding. If he is the victim of malicious prejudice let him ignore it. If he is unjustly attacked let him not stoop to competitive methods. Above all, let him work to develop a judicious mind and a determination to carry out the ideals of his profession for the benefit of every human being with whom he has contact." — From Franklin Martin's "Fifty Years of Surgery".

Case Reports

TWO CASES OF DESMOMA OR DESMOID TUMOUR*

BY MR. FREDERICK W. MARLOW, F.R.C.S. (ENG.),

Toronto

CASE 1

Mrs. T., aged 34 years, married, nulliparous, was seen on January 16, 1918, at the Bowmanville Hospital with Dr. B. J. Hazelwood, complaining of a swelling in the lower and centre part of the abdomen. This had been noticed for a few months and had increased in size fairly rapidly, and while there was some general discomfort in the abdomino-pelvic region there was very little pain. There was some increase in frequency of urination but no menstrual symptoms. Her general condition was good. Examination revealed a very firm, rounded, precipitous, immobile tumour immediately above the pubes. The arc presented was quite equal to that of an average fetal head. Pelvic examination showed the pelvis to be almost entirely filled with a hard immovable mass merging into that felt through the abdomen. The cervix of the uterus was directed downwards and forwards, and the body of the uterus seemed to be lying far back in the hollow of the sacrum. The whole pelvis was practically jammed with the tumour. Tensing the abdominal muscles did not alter the outward appearance of the mass. While its very large size, as felt bimanually, suggested a fibroid tumour of the uterus its anterior part seemed to have an intimate connection with the abdominal wall. Further examination was made under anæsthesia, when it was found that the much retroposed uterus could be moved slightly and independently and that the tumour, though largely filling the pelvis, was incorporated in the abdominal wall.

Operation was undertaken forthwith and proved to be exceedingly difficult. The tumour, which had evidently arisen from the fascia posterior to the recti muscles, had so invaded these muscles that large portions of them had to be sacrificed. The peritoneum which was carried inwards was inseparable from the tumour, and when the removal of the whole mass was complete adequate repair of the abdominal wall presented an almost impossible problem. However, by means of various manipulative procedures, by way of giving and taking, satisfactory closure was accomplished and the operation concluded. Had the Gallie living suture operation been as much in vogue at that time as it is at present the major difficulties might have been more readily met. Later progress was very satisfactory. The abdominal wall remained secure and a subsequent pregnancy progressed to full term without difficulty. There has been no recurrence.

The tumour in this case was quite as large as an elongated fetal head. It was very hard and not capsulated. It was, however, well delimited as muscular invasion extended over its entire front. It was difficult to cut and the cut surface had the appearance of "intertwining bands of connective tissue", as described by Ewing. Microscopic examination showed a great preponderance of fibrous tissue, with considerable muscle interspersed in its outer anterior portions. There was no marked cellular activity and no suggestion of fibro-sarcoma. While the site occupied is the most frequent for a desmoma, it was unusual on account of its great size and because it occurred in a woman who had not previously borne a child or had had an abdominal operation.

CASE 2

Miss O., aged 26 years, consulted me on April 16, 1925, having been referred by Dr. Fletcher Sharpe. She complained of a lump on the back of her right shoulder. This was first observed four months previously, and during the interval had grown steadily. There was no pain, but a more or less constant ache. She had previously suffered from frontal sinus infection and her general health was considerably under par. Below and outside the junction of the back of her neck and right shoulder there was an elongated ovoid tumour projecting about an inch at its middle and extending over an area about three inches long and two inches wide. It was firm, though very slightly elastic, and its arc was quite regular. The super-

* Presented at a meeting of the Wellesley Hospital Clinical Society on February 16, 1933.

imposed skin was free and normal in appearance. The tumour appeared to extend deeply into the muscular tissue and its slight mobility showed that it was not attached to underlying bony structures. Its long axis corresponded to the direction of the fibres of the trapezius muscle, and it was thought to be imbedded in it. There was no glandular involvement in the neck. The diagnosis of a desmoid tumour was made, though the possibility of fibro-sarcoma had to be considered.

Operation was performed nine days later. A curved incision with the convexity backwards was made over the tumour and the skin was reflected forwards. The tumour was removed with a section of the trapezius muscle extending beyond its entire depth. The muscle was quite inseparable from the outer parts of the tumour. Dissection was quite clean, and there did not appear to be any irregular extension into the surrounding tissues. The gap was closed by suturing the fascia over the muscle with catgut, and skin closure was effected by dermal suture. Gross section of the tumour showed it to be quite fibrous and well delimited, though not capsulated. Microscopic examination was undertaken by Dr. W. L. Robinson, who reported that while the mass was mainly fibrous in character there was sufficient cellular activity to favour the diagnosis of fibro-sarcoma.

Because of the uncertainty thereby introduced into the prognosis it was determined to follow up with x-ray treatment, and such was carried out in a series by Dr. Harold Tovell. Later, the patient was examined at various intervals, and on June 29, 1927, more than two years after the operation, it was noted that the scar was in a good state and that the skin and tissue were as pliable as on the unaffected side. Examined again on January 7, 1933, nearly eight years after the operation there was still no sign of recurrence. On this date she came under observation because of a lump in the right breast which has since been locally removed. Dr. G. W. Lougheed, by biopsy, confirmed the diagnosis of peri-canalicular adeno-fibroma. Exhibition of the patient now affords an opportunity to see the good result nearly eight years after the surgical removal of a tumour in the trapezius muscle in which microscopic examination favoured the diagnosis of fibro-sarcoma as opposed to the clinical diagnosis of desmoma. The result would seem to favour the latter.

A desmoma is essentially a tumour arising from fascial or aponeurotic structures. It differs from a fibroma mainly in not being capsulated and by its tendency to invade surrounding muscle. It is unlike fibro-sarcoma in that it seems to invade along its entire front, is well delimited, and when completely removed shows little or no tendency to recur. Local recurrences have been recorded in cases in which removal has been incomplete. The disease may repeat itself without malignancy supervening, even though there may be a tendency to such change. The first desmoid tumour seen by the writer was removed at a surgical clinic in London, England, in 1902. Its origin was the fascia lata of the thigh. Though the designation has remained actively in his mind the two cases herein reported are the only ones coming to his personal attention since then. One of the more recent reviews, and one of the best, on the subject is to be found in the *Annals of Surgery*, 1930, and is contributed by Dr. James Masson, of the Mayo Clinic. It may not be out of place to add these two cases to the literature of a subject which, because of the comparative rareness of the disease, is by no means extensive. In the second case it is impossible to estimate what value, if any, might be assigned to the follow-up treatment by x-ray. Dr. Masson's review clearly indicates that in the few cases in which radiation was the chief means of treatment recurrence was the rule. Results distinctly favour radical surgery and subsequent raying.

A CASE OF PRIMARY CARCINOMA OF LIVER

BY S. A. THOMSON,

Department of Pathology, University of Toronto, Toronto

Primary carcinoma of liver is relatively rare in the white race, but not uncommon in the Chinese, in whom it is usually associated with cirrhosis of the liver. There are two main types, the hepatoma, or liver-cell carcinoma, and the bile-duct carcinoma, or cholangioma. The former is more common and the case

reported here belongs to that class. The bile-duct type is not so often associated with cirrhosis. The liver is usually deeply jaundiced and contains numerous tumour masses. The massive solitary form of tumour is not seen in the bile-duct carcinoma. The hepatoma or liver-cell carcinoma usually forms massive growths with frequent necroses and hæmorrhage. It also occurs in the form of multiple nodules scattered throughout the liver. The hepatomas are almost constantly associated with cirrhosis, usually of the portal type.

A clinical diagnosis is difficult; emaciation, jaundice, ascites, epigastric distress, and a visible tumour are a few of the possible signs. Jaundice is by no means a constant sign, but occurs more frequently in the bile-duct type; ascites and the palpable tumour are more constant. An important and common sign is enlargement of the liver upwards, with a high fixed diaphragm. Metastases may be the first sign of the growth, as in our present case.

The following is a brief clinical and pathological report of a case.

History.—G.L., male, 72 years of age, a wood finisher, English. He was quite well up until 8 months previously, when he developed a pain over the lumbar region posteriorly. This condition remained about the same until 6 weeks before reporting, when it became so severe that he was forced to remain in bed. There had been a noticeable lump in the upper part of his abdomen for the previous 6 weeks, associated with swelling of the legs. He had lost 45 lbs. in weight in the last 8 months with increasing weakness. His appetite was poor, but there had been no vomiting or epigastric distress, and no jaundice.

Examination.—Prominent dilated veins were noted over the right side of the chest and abdomen. Moderate œdema of the lower extremities was present. *Chest.*—Diminished excursion of lung bases with a few fine râles. *Abdomen.*—Rounded. Considerable free fluid in the peritoneal cavity. The liver was enlarged down to the umbilicus, with a smaller soft mass above it; it was firm and nodular. *Osseous system.*—Marked tenderness over the 10th, 11th, and 12th thoracic spines. An x-ray of the spine was suggestive of secondary carcinoma involving the 12th thoracic and 2nd lumbar spines.

Clinical diagnosis.—Primary carcinoma of stomach or sigmoid; secondary carcinoma of the liver and spine; chronic degenerative myocarditis with insufficiency.

Autopsy.—Abdomen was thin. The peritoneal cavity contained about 1,000 c.c. of clear, amber-coloured fluid. The lower margin of the liver was almost down to the level of the umbilicus. The organ was tremendously enlarged and distorted, weighing 13 lbs., and measuring 34 by 26 by 13 cm. The capsular surface of the right lobe had a coarse lumpy appearance, with a mottling of hæmorrhagic and yellowish areas. The left lobe was about one-fifth the size of the right, light brown in colour, and rubbery in consistency.

The cut surface of the right lobe presented a variegated appearance. It bulged irregularly with ill-defined tumour masses. Many of the tumour areas were quite soft and necrotic and mottled with much hæmorrhage. No normal liver tissue could be recognized in this lobe. The left lobe was much firmer in consistency. Its capsular surface was finely nodular; its cut surface presented fairly normal liver tissue. Two small tumour nodules were present in this lobe, measuring 3 and 1 cm. in diameter, respectively. They were soft and dull red in colour.

Tumour metastases were found in the vertebræ and one rib. There was a pathological compression fracture in the 12th thoracic body. These metastases were quite similar to those found in the left lobe of the liver.

Microscopic report. — The growth bore a marked resemblance to the structure of normal liver, except that it was more deeply stained, formed irregular lobules, and invaded the surrounding tissue. The lobules of the tumour tissue were divided by irregular bands of thick connective tissue. Diffuse microscopical metastases were found throughout the lungs.

Discussion.—Strong and Pitts,[1] of Vancouver, have reported 12 cases of primary carcinoma of the liver in a twelve-year period from 2,000 autopsies. They found it associated commonly with the liver fluke and extensive cirrhosis in members of the oriental population. Tull,[2] of Singapore, reported a series of 134 cases out of 17,664 autopsies. He found the liver fluke to be relatively uncommon, but agrees that cirrhosis of the liver is present in the great majority of cases, especially those of the liver-cell type. Ewing[3] believes that cirrhosis is a

strong predisposing factor, but feels that part of it develops as a result of the growth.

SUMMARY

A case of primary carcinoma of the liver-cell type is reported. This patient was born and lived in Liverpool, England, up until 24 years ago, and had never lived in an eastern country. It is interesting that his first complaint was related to the metastases in the vertebræ, and that there were no epigastric signs related to liver dysfunction except the palpable tumour and ascites.

This is the second case of primary carcinoma of liver in 3,000 autopsies performed in this Department under the direction of Prof. Oskar Klotz during the last six years. The first case was in a Chinaman, and showed marked portal cirrhosis.

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A CASE OF NARCOLEPSY*

BY A. W. YOUNG, M.D.,

Montreal

(Case No. 97). Miss L.S., aged 19, was admitted to the Neurological Service of the Royal Victoria Hospital, October 31, 1934, with the complaint of attacks of sleepiness.

History of illness.—When the patient began to work as a waitress four years ago she commenced to have "spells" of sleepiness during which she could hardly keep her eyes open, if she did not actually fall asleep. These attacks increased in frequency and became extremely annoying to her and to her parents, because they came on at any time of the day and gave her many embarrassing moments. They were particularly prone to occur immediately after a meal, but it was not infrequent for her to fall asleep over her breakfast. When travelling in the street car she made a point of transferring frequently in order to keep awake, because on several occasions she had fallen into a heavy sleep and passed her stop. When at her work, if not busy, she got the impulse to sleep and fought it off by dashing her face with cold water. She described the attacks as a feeling of sleepiness, coming on suddenly, although sometimes preceded by an uncomfortable feeling in the back of the neck and spots in front of her eyes, and being well-nigh irresistible. Her eyes close; she falls asleep for a moment or two—the exact duration varies—and she can be awakened. When she awakens she is somewhat refreshed; sometimes there is a numb feeling in the back of her head and occasionally soreness under her eyes. These attacks occurred most frequently when she was sitting down. She had never fallen in any of them. If she was working or dancing she did not have an attack, but if she sat down then one was apt to come on.

On direct questioning she told of her legs feeling weak when she laughed heartily and this had been present for about one year. She made a special effort to restrain her laughter because of the general weakness and sinking feeling when she allowed full vent to her emotions.

Family history.—She lost her mother when she was 3 or 4 years of age; her father is living and well; her stepmother is well and takes a very keen interest in the patient, and is very much alarmed about these attacks. One sister died at birth; two brothers living and well; two step-brothers and one step-sister living and well. There was no family history of nervous or mental disease.

Past history.—Nothing of note. She had whooping-cough and measles as a child, and an abscess in her right ear three years ago and stated that she heard less well with her right ear. Her menstruation began at 14; slight mild dysmenorrhœa before and during the first day.

Physical examination.—A well developed, healthy-appearing girl, who takes a keen interest in her surroundings, cooperating well, giving a clear and complete story of her illness, is oriented in all spheres, and with good memory. Aside from slight horizontal nystagmus on bilateral gaze, there was a slight reduction of hearing in the right ear (air conduction was greater than bone conduction in both ears, and the Weber test was lateralized to the left). Alternating movements were done less well with the left arm than with the right. There was absence of the upper left abdominal reflexes and slight symmetrical increase in deep

* A communication to the Montreal Neurological Society on November 7, 1934.

reflex activity. There was nothing else of note on neurological examination. Examination of the other systems revealed nothing of importance.

Special examination of the nose and throat showed that tonsillectomy and adenoidectomy had been well done. Dental report was to the effect that the teeth were in excellent condition. The basal metabolic rate was 0 per cent, but when repeated, because of poor cooperation, it was minus 17 per cent. Urinalysis was negative. The blood count showed a normal picture. The blood Wassermann test was negative. Blood chemistry showed normal values for urea, urea nitrogen, creatinine, non-protein nitrogen, serum calcium and percentage of sugar. The cerebrospinal fluid pressure was normal; the Wassermann test, negative; total proteins, sugar and chlorides of normal value. Encephalogram read by Dr. Russel: "The ventricles and subarachnoid space were well filled. Part 3 on the left side was perhaps a little broader than the corresponding part on the right. This may be due to a little asymmetry of the plate. The sella turcica was not abnormal."

Progress in hospital.—The patient was kept in bed. While in the hospital she showed some evidence of sleep attacks. The other patients remarked that at one minute they would be talking to the patient and the next she would be asleep, and the nurses remarked that she has had as many as three sleeping spells during a day, of about ten minutes' duration. She was placed on ephedrin, grain ¼, to be taken four times a day, and discharged November 12th, to return two weeks later to have the prescription refilled, when she remarked that she was feeling much better and had had no more sleep attacks.

Diagnosis. — Narcolepsy. This diagnosis is offered because of the attacks of sleep which were uncontrollable and the cataleptic attacks brought on by hearty laughter. The etiology was not determined, but it is of interest that ephedrin has given her relief, although it is much too early to say how lasting the effects will be.

Clinical and Laboratory Notes

SURGICAL PROCEDURES IN THE TREATMENT OF CHRONIC ATROPHIC RHINITIS

BY B. F. MACNAUGHTON,

Montreal

Whatever the cause of ozæna, the fact remains that there is an abnormally large intra-nasal space. If after investigation and attention to any co-existing sinus infection, the abnormally large space can be lessened, we may expect some amelioration or cessation of the symptoms.

This may be accomplished: (1) By swinging the antral wall toward the septum and holding it in place by means of adhesions between the wall and septum; (2) by bringing the septum toward the lateral wall.

There are two main types of operation for the first procedure: (*a*) Lautenschlaeger's—He published his method in 1916 which he evolved in the course of a radical antrum operation. Its principle is to narrow the nasal cavity by transposing the lateral nasal wall on both sides of the septum. (*b*) Halle does much the same operation, but entirely endo-nasal.

The second procedure, *viz.*, the bulging of the septum toward the lateral wall has been carried out with considerable success. Many types of material have been used: paraffin inlays, ivory, bone and cartilage. These inlays were placed under the muco-periosteum of the septum or the floor of the nose.

Four post-operative cases were shown, in which cartilage implants had been done; the oldest two years, the latest seven days after operation. In three of these cases radium had been used before operation. The improvement in these patients, particularly in the lessening of crusting in the nose and the disappearance of the fetor, makes the operation worth while.

* Read at Section of Oto-Laryngology of Montreal Medico-Chirurgical Society, Montreal, February 13, 1935.

A NEW METHOD FOR THE DETECTION OF OCCULT BLOOD

Boas describes a new method for the examination of occult blood in the fæces. The reagent is a 0.2 per cent solution of 2.7 diamino-fluorine-chloral hydrate in 50 per cent acetic acid. It does not deteriorate with keeping, and remains in the same concentration, thus having an ad-

vantage over benzidine and guaiacum. A fine smear of carefully washed fæces is made on a clean slab. Pure acetone is poured on and, after gentle shaking of the slab, it is allowed to stand for five to ten minutes. If the smear contains much colouring matter, decolorization is repeated two or three times with acetone. Five c.cm. of absolute alcohol and ten drops of glacial acetic acid are then poured on the fæces, and the slab is gently shaken to and fro, and then allowed to stand for some minutes. The alcohol is poured off, and 3 to 5 drops of the reagent together with 3 to 5 drops of freshly prepared hydrogen peroxide solution are added to the smear. If occult blood is present the smear turns green or blue with increasing intensity in a few minutes. The cleaner the material and the more hæmatin present, the greater is the intensity. If the smear is kept in a dark place it retains its distinctive colour for twenty-four hours, after which time it turns olive green. If only minute quantities of hæmatin are present, a late reaction occurs after ten or twenty minutes. If there is no hæmatin in the fæces, the green colour occurs only when the smear has stood for some time. Boas lays great stress on the thorough cleansing of the fæces with acetone, which dissolves the fæcal colouring matter and concentrates the hæmatin present. The new reagent is not superior to benzidine in detecting minute quantities of occult blood, but it does not deteriorate, and the smear can be kept for several days.—*Klin. Woch.*, June 30, 1934, p. 942.

Editorial

EMMENIN

THE study of extracts of the human placenta which Collip[1,2] commenced in 1929 led to the recognition that three different types of biologically active substances were present. In the first place there were ether-soluble substances of the œstrin or follicular-hormone type, comparable to the œstrone (theelin) which had recently been isolated from pregnancy urine and to œstriol (theelol) and other members of this series which have been discovered subsequently in pregnancy urine and elsewhere, all such substances being characterized by their power to evoke the phenomena of œstrus in ovariectomized rats and mice. There was, secondly, a substance insoluble in ether and in alcohol, inactive in oöphorectomized animals, but capable of stimulating the ovaries of immature rodents to precocious development of large follicles and of luteal tissue, hence causing a precocious appearance of œstrus; since the effects of this fraction superficially resembled those obtained[3,4] by implantation of anterior pituitary tissue, the substance was referred to as "anterior-pituitary-like", or "A.P.L." It is indubitably identical with the similar substance in human pregnancy urine which is the basis of the Aschheim-Zondek pregnancy test and to which Zondek gave the name "Prolan".

The third fraction was somewhat enigmatic, and appeared to occupy an intermediate position. It did not possess the solubility in ether observed in the œstrin group, and had little biological activity when tested on oöphorectomized animals; it did cause precocious appearance of œstrus when administered to immature rats; yet it did not apparently affect the structure of the ovary, and it differed from A.P.L. or prolan in being far more soluble in alcohol or acetone and in having no demonstrable action in male animals. It was later found[5,6] that this fraction, to which the name "emmenin" was given, could be made to yield œstrin when subjected to acid hydrolysis. Emmenin, therefore, is to be regarded as a compound (probably an ester) of an œstrin with some unknown substance, a compound which is

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2. COLLIP, J. B.: Further observations on an ovary-stimulating hormone of the placenta, *Canad. M. Ass. J.*, 1930, **22:** 761.
3. SMITH, P. E. AND ENGLE, E. T.: Rôle of the anterior pituitary in the development and regulation of the genital system, *Am. J. Anat.*, 1927, **40:** 159.
4. ZONDEK, B. AND ASCHHEIM, S.: Hypophysenvorderlappen und Ovarium, *Arch. f. Gynäkol.*, 1927, **130:** 1.
5. COLLIP, J. B.: Interrelationship between the pituitary gland, the ovaries and the placenta, *Trans. Roy. Soc. Can., Sect. V.*, 1932, **26:** 1.
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broken up by treatment with acid. This particular compound of œstrin, unlike such synthetic esters as the benzoate, differs very markedly from free œstrin both in solubility and in biological properties, especially in requiring the presence of ovarian tissue in order to unfold its full activity. The presence of substances of the emmenin type in pregnancy urine was established[5]; and Marrian and his colleagues[7] report that as much as 99 per cent of the total œstrin excreted during pregnancy is present as an ether-insoluble combined form, of low activity in the usual œstrin tests.

Clinical trial of these substances was soon commenced. At that time the activity of orally-administered œstrin was underestimated; the chemically-pure œstrin preparations and derivatives now obtainable are still usually given parenterally. Emmenin is not yet available in a state of purity, and in any case appears to lend itself, perhaps because of its solubility, to oral administration. Campbell and Collip[8,9] found it valuable in a considerable proportion of cases of oligomenorrhœa, of recently-developed menopausal disturbances, and of dysmenorrhœa. Elsewhere, too, good results have been obtained, especially in the last-mentioned condition, and this issue of the *Journal* (see page 609) contains an admirably conservative, yet encouraging, report[10] of favourable results in suitable cases of dysmenorrhœa. Emmenin is not a panacea for menstrual disorders, nor applicable to all cases even of this type; no attempt has yet been made to emulate the heroic feats of those who have obtained menstruation in oöphorectomized women by administering enormous doses of œstrin and corpus-luteum hormone; but the empirical fact remains that many cases seem to benefit from surprisingly small doses of emmenin, easily and safely given by mouth.

Campbell and Collip[9,11] found that the anterior-pituitary-like principle was applicable in certain cases of menorrhagia and metrorrhagia. Preparations from urine were used for the same purpose at about the same time by Zondek[12], and later by Novak and Hurd[13] and many others. Many preparations of this type, chiefly of urinary origin, are available ("antuitrin S", "follutein", etc.) and no doubt differ in purity and potency, but are all fundamentally similar. They are different, however, from the ovary-stimulating extracts obtained from the pituitary gland itself, but these have not been widely employed in clinical studies. The urinary and placental preparations have been put to a variety of therapeutic purposes. Novak[14] has surveyed this question, though paying little attention to the contributions of Canadian and European authors. Henderson[15] now reaffirms the value of this substance in menorrhagia and metrorrhagia, while again emphasizing the necessity of excluding malignancy or other local causes of uterine bleeding in the cases selected for treatment. Since this principle must be given by injection, and usually over rather long periods, and since the indications for its use are established only after scrupulously careful examination, it has not the appealing simplicity of emmenin therapy. Moreover, the fact that animals treated over long periods with A.P.L. eventually develop a substance inhibitory to its action[16] may possibly indicate other limitations in its therapeutic application. These difficulties are offset by the enormous importance in practice of any conservative method of treatment for metrorrhagia.

D. L. THOMSON.

7. COHEN, S. L., MARRIAN, G. F. AND WATSON, M.: Excretion of œstrin during pregnancy, *The Lancet*, 1935, **1**: 674.
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THE COMMUNICATIONS BETWEEN THE PULMONARY LOBULES

OUR lungs consist essentially of an intricate series of passages. When traced downward, it is found that there is definite separation of the terminations of these passages from each other, just as the finest twigs of a tree's branches are separate. But, even as there spring from twigs the closely intermingling leaves, so there bud out from the tips and sides of the terminal bronchioles the clusters of air chambers we call alveoli, which interlock with such intimacy that only on the most careful examination are they seen to be actually separate. The pattern of the lung is made up of innumerable such terminal expansions, each of which (that is, each terminal bronchiole with its alveoli) forms a unit called a lobule.

Now, descriptions of the pulmonary tree have always insisted on the complete isolation of these lobules from each other, from which it would follow that the ebb and flow of our respired gases in these terminal units could be along one path only, since they would be passages with blind ends. But this conception of the anatomy of these terminal air spaces has been challenged from time to time. It has been shown by various observers that the alveoli of contiguous lobules do actually communicate with each other to some extent, but until recently the sceptics, that is to say, the majority of anatomists, have dismissed the evidence of such "pores" or "stomata" as unconvincing. Such holes, they said, were artefacts, or were caused by disease, such as emphysema. And when one recalls the infinitely tenuous character of the alveoli this scepticism has probably been justified in many cases. Now, however, the accumulation of evidence on the point can be disregarded no longer. We owe to Professor C. C. Macklin* an extremely lucid and convincing review of the subject, together with valuable observations of his own. He presents microphotographs which show these "alveolar vents", as he terms them, perfectly clearly. Whilst those shown are from experimental animals, he tells us that he has also demonstrated them in a number of human lungs. He explains that search has to be made for them in preparations made with painstaking care under special technical conditions, and has found them well displayed in thick sections of lung tissue fixed in the stage of expansion, where the vents can be viewed *en face* in alveolar walls lying parallel with the slide. With the inevitable retraction of the alveolar walls which occurs under fixation, almost all of the vents are closed, even when the alveoli are only partially collapsed, and they are thus invisible in ordinary sections such as the pathologist uses.

It is not so easy to assign an appreciable significance to these openings. Professor Macklin suggests that they may provide a means of equalizing alveolar air pressure under normal conditions, and points out that they are particularly numerous in the dog, in which animal the lungs are in such continually active operation. In disease, however, and in artificially produced abnormal conditions, there is more indication of their probable function. Indeed, it is some of this experimental work which has provided additional proof of their presence. If, for example, a lobule is blocked off at its entrance there should not be, according to the older anatomical view, any means by which its alveoli could receive air, and therefore the continued absorption of their contents by the surrounding capillaries would lead to their collapse. The work of Van Allen and Lindskog showed, however, that this collapse did *not* always occur, and they attribute this largely to the fact that these vents allowed air to come in from the neighbouring lobules whose stems were still open. In this respect these communications may quite properly remind us of the part played by collateral channels in the vascular system, although Professor Macklin is anxious to point out that there is not a complete parallelism between such well defined channels as arterial anastomoses and these minute interlobular openings.

We hope to hear further on this interesting point, but in the meantime would draw attention to Professor Macklin's illuminating contribution to his already comprehensive writings on pulmonary anatomy. H.E.M.

* Macklin, C. C.: Pulmonic alveolar vents, *J. Anat.*, 1935, **69**: 188.

Editorial Comments

Sir Richard Rawdon Stawell, K.B.E., M.D.

We regret to have to announce the death of Sir Richard Stawell, of Melbourne, Australia, who was to have presided over the approaching meeting of the British Medical Association in Melbourne next September. He was born at Kew near Melbourne, the son of the late Sir William Foster Stawell, Chief Justice of Victoria. His early schooling was obtained at Marlborough College and Hawthorn Grammar School, whence he passed to Trinity College Melbourne. He received the degrees of M.B. and B.S. of Melbourne University (1888), and after holding resident posts proceeded M.D. in 1890. During the next three years he studied in the United States, Germany, and England. On returning to Victoria in 1893 Doctor Stawell was appointed to the honorary medical staff of the Children's Hospital, serving in that capacity until 1914. From 1894 to 1900 he was honorary co-editor of the *Australian Medical Journal*. He took an active part in promoting the amalgamation of the Medical Society of Victoria with the Victorian Branch of the British Medical Association. From 1902 until 1924 Doctor Stawell served as an active member of the honorary medical staff of the Melbourne Hospital. In 1915 he served with the Third Australian General Hospital on active service, with the rank of lieutenant-colonel, A.A.M.S., but returned the following year to continue his clinical teaching and perform other home service work. He was created K.B.E. in 1929. In 1930 he became the first president of the newly formed Association of Physicians in Australia, and in 1932 was the vice-president of the Section of Medicine at the Centenary Meeting of the British Medical Association. Sir Richard married in 1908 and leaves one son and two daughters.

Sir Thomas Dunhill, in the *British Medical Journal* for May 4th, has given a sympathetic appreciation of Sir Richard. He says of him:—"It is probable that in Australia no death in the profession has caused such widespread sorrow as that of Sir Richard Stawell" . . . "A great teacher, a great personality, a great friend of all the world has gone".

Probably few in Canada knew the late Sir Richard Stawell personally, but the Canadian Medical Association extends its sympathy to his bereaved family, and desires to express to the British Medical Association its regret that the highest office in its gift, the presidency, will not be occupied next September by this gifted man.

A.G.N.

The British Health Resorts Association

The British Health Resorts Association, of which Dr. Alfred Cox, so well known in Canada, is General Secretary, with offices in London at 199 Piccadilly, W.I., is a purely voluntary and non-profit-seeking organization, which is the outcome of the "Wintering in England" movement which was inaugurated at the end of 1931 by a number of medical and other public-spirited men. Since that time it has grown in scope and influence. The Association came into being during a time of great financial stress as a result of a widespread feeling that a great deal of money was being spent abroad in the pursuit of health which could be spent at home with equal advantage to the patient and with great benefit to the community. It soon became apparent that there was room for a permanent organization which could make the virtues of the British health resorts better known and also establish their peculiar qualities on a scientific basis. Accordingly, an attempt was made to interest the medical profession in the project, with gratifying results. Among the objects of the Association, also, are the promotion of post-graduate instruction for doctors in Medical Climatology, Hydrology, and kindred subjects, and the inducement of medical schools to grant a diploma to distinguish those who have made a special study of these subjects from those who have not. Further, the Association works hand in hand with local authorities, hotel and boarding-house keepers, caterers for amusement and transport, as well as with doctors and directors of spas. It is doing work which no other body has ever tried to do. While there are many organizations which concern themselves with developing various localities as *pleasure*-resorts there is no other organized body which emphasizes their value as *health*-resorts.

One other activity of the Association, to which attention should be directed is the publication of a handbook* which is unique, in that it gives authoritative information about every health resort in the British Empire, of such a character as to be useful to the medical man who wishes to know the best place to which to send a patient and to members of the public who are looking for a suitable and healthy locality for temporary or permanent residence. The book is attractive-

* British Health Resorts — Spa-Seaside-Inland — including New Zealand, South Africa and Canada. Edited by R. Fortescue Fox, M.D., F.R.C.P., F.R.Met S. Price one shilling net. J. & A. Churchill, Ltd., 40 Gloucester Place, Portman Square, London, 1935.

ly produced, with regional maps and numerous beautiful half-tone illustrations of the various resorts. While it gives some information such as is found in guide-books, it is not a guide-book. It is much more. The attractions of the different resorts are set forth, with special emphasis on the climatic peculiarities of each, and the medical indications for which they may be recommended. The "waters", whether used for drinking or for bathing, are described in some detail and their therapeutic value set forth. A valuable feature is that part of the book which deals with the advantages of certain districts as winter resorts, an aspect of the subject which is not often thought of. In this particular the British health resorts have been unjustly passed over in the past in favour of Continental spas.

The health resorts of Canada, New Zealand, and South Africa are also dealt with, though, necessarily, more briefly. The references to Canada are sympathetic, but we wish more could have been said. The statement is made that "there appear to be, as yet, very few spas or marine or inland resorts offering facilities for curative treatment, such as are considered requisite for delicate children or the large number of industrial or brain workers who are convalescent from illness, or who break down in middle or later life with rheumatic, heart, or circulatory, chest or nervous disorders." This is, in general, true, unfortunately. Apart from many excellent sanatoria for tuberculosis, there are not many resorts that cope satisfactorily with other types of disease. The springs at St. Catherines, the Carlsbad Springs, near Ottawa, the Banff Hot Springs in Alberta, the Harrison Hot Sulphur Springs and certain others in British Columbia are the best known. Perhaps we are slow in developing our resources in this particular.

Before we send our patients to the continent of Europe we would do well to consider the advantages of the British health resorts. All necessary information can be obtained from this handbook, or from Doctor Cox. Inasmuch as the handbook has been revised by a Medical Advisory Committee, with the assistance of Medical Health Officers and local medical societies, it may be regarded as reliable and authoritative. A.G.N.

What You Should Know About Series No. 2 Economical Cooking*

This, the second of the booklets on public health topics, sponsored by the Canadian Medical Association and the Life Insurance Officers' Association, has been designed "to show how, by the proper selection and preparation of foods it is possible to supply adequate nourishment in an attractive and tasty manner, at a comparatively low cost." Diet and dieting are, we believe, a legitimate part of the science of public health, and our Associate Secretary, Professor Grant Fleming, is an acknowledged expert in this subject. Until we saw this book, however, we had no idea of the extent and the exactness of his knowledge and the range of his versatility. Doctor Fleming refrains, it is true, from giving us the well-worn admonition said to be found in the old-style cookery books— "First catch your hare", nor does he tell us how to catch our hare, no small matter in these hard times, but this is about all he omits. He tells us, or our wives, how to feed the family, what is the proper kind of food to eat, how much to eat, and how to prepare our meals. Then, he gives us rules for cooking, numerous recipes for palatable dishes which would do credit to a professional chef, and daily menus for a fortnight. There are numerous practical hints as to how money may be saved. He concludes with the important matter of budgetting. We learn that if our income is $1,000.00 a year approximately 40 per cent of this amount should be spent on food; 25 per cent, on shelter; 15 per cent, on clothing; 10 per cent, on saving and advancement; and 10 per cent for operating expenses. On this basis the daily cost of food per person is $0.22. Marvellous! The investment of the absurdly small sum of twenty-five cents will pay large dividends, we are convinced. We all need this book. A.G.N.

* Economical Cooking. Edited by Grant Fleming, M.C., M.D., D.P.H., F.R.C.P.(C.). Macmillan Co. of Canada, Ltd., Toronto, 1935. Price twenty-five cents.

Make not the consequence of Virtue the ends thereof. Be not beneficent for a name or Cymbal of applause, nor exact and just in Commerce for the advantages of Trust and Credit, which attend the reputation of true and punctual dealing. For these Rewards, though unsought for, plain Virtue will bring with her. To have other by-ends in good actions lowers Laudable performances, which must have deeper roots, motives, and instigations, to give them the stamp of Virtues.—Sir Thomas Browne.

Since virtuous superstructions have commonly generous foundations, dive into thy inclinations, and early discover what nature bids thee to be, or tells thee thou may'st be. They who thus timely descend into themselves, and cultivate the good seeds which nature hath set in them, prove not shrubs but Cedars in their generation. And to be in the form of the best of the Bad or the worst of the Good will be no satisfaction unto them.—Sir Thomas Browne.

Special Articles

RADIUM: ITS DISCOVERY, PROPERTIES, PREPARATION AND USE

BY JOHN D. LEITCH,

Ontario Department of Health,

Toronto

The discovery of Ohm's Law in 1825, showing the relation between current and potential difference for solid conductors, led to an investigation of the principles underlying the conduction of electricity in liquids and gases. Out of Faraday's work on liquids came the laws of electrolysis, and from the work of Crookes and others on gases came our knowledge of cathode rays and Roentgen's discovery of x-rays.

The years 1895 to 1900 were exciting times for the scientific world. In 1895 Roentgen discovered x-rays; in 1896 Becquerel discovered radioactivity; and in 1897 J. J. Thomson showed cathode rays to be particles of matter having a negative charge. In 1898 Madame Curie discovered radium, and in 1900 Rutherford separated the rays from radium into three types called alpha, beta and gamma rays. Everybody was talking about rays, and it can be imagined how stories spread and facts became distorted. These discoveries, as we shall see, upset former ideas of matter and of the elements, and hence disturbed the chemists, who believed the atom to be indivisible. Further studies led to a knowledge of a group comprising about thirty new elements, and introduced the idea of isotopes, which are elements having identical chemical properties but differing in mass.

CATHODE RAYS

Before proceeding to discuss radium itself it might be well to consider some of the foregoing discoveries in greater detail. It is well known that if a bullet be fired at a block of steel the loss in kinetic energy of the bullet gives rise to new forms of energy, by far the greatest quantity of which appears as heat, but at least two others are produced, namely, sound and light.

The investigation of electrical discharge through gases showed that some sort of rays proceeded from the cathode to the anode. These were called cathode rays. Fig. 2 shows a cathode ray tube which is merely an evacuated glass vessel having two electrodes. When a source of high potential difference is applied to such a tube, the glass will fluoresce with a green or yellowish glow. It will appear as if a stream of rays is proceeding from the negative terminal C towards the anode A. If the anode be set off to one side as in the figure, some of the rays will continue in their path towards the larger portion of the tube. B is a thin aluminum disc inserted in the narrow portion of the tube beyond the anode. This disc is sufficiently thick to stop the beam of rays and only those falling on the pin hole at F will travel on towards the zinc sulphide screen D, hitting it at E and causing a small spot of blue fluorescent light.

If one pole of a strong magnet be placed in the vicinity of G in the above figure the beam of rays will be deflected in a direction at right angles to itself and to the magnetic field. This will produce a movement in the fluorescent spot at E. On reversal of the polarity of the magnet the spot will move in the opposite direction. If, further, a negatively charged ebonite paddle be placed close to the beam, the spot will be seen to move in a direction away from the paddle. These experiments show that the cathode rays are negatively charged. The work of J. J. Thomson showed beyond doubt that cathode rays are negatively charged particles having a constant negative charge and mass. They were called electrons and are now known to be one of the constituents of all matter.

X-RAYS

While investigating the spectrum of fluorescent light emitted from various materials when bombarded with cathode rays, Roentgen placed a piece of black paper over the cathode ray tube, thereby stopping all visible light. To his surprise he found that certain crystals, such as barium platino-cyanide, continued to fluoresce when kept in the vicinity of the discharge tube. Having made sure there were no leaks he decided that this fluorescence was due to some radiation which had the power of penetrating the heavy black paper. He called this new radiation "X-rays". Further experiments showed that these new rays were not corpuscular in nature, nor had they any mass or electric charge like cathode rays. Their power of affecting a photographic plate was soon utilized by the medical profession in obtaining "shadow-pictures" of the human body.

The penetrating quality of x-radiation was found to increase with the speed of the electrons in the cathode stream, and this in turn increased when a higher potential difference was applied to the discharge tube. The material on which the cathode rays impinge determines

also the hardness or penetrating quality of the radiation produced.

An early type of x-ray tube is shown in Fig. 3. It is merely a modified form of cathode ray tube, except that the rapidly moving electrons from the cathode C are made to converge on a tungsten target T attached to the anode A. The technique of the production of x-rays was greatly improved with the advent of Coolidge tubes, which used a heated filament as the cathode, thereby providing an abundant supply of electrons. With improvement after improvement in the design of x-ray tubes and associated equipment there has been a tendency to use higher and higher voltages giving a more penetrating x-radiation for use in the treatment of deep-seated malignant tumours. It is a far cry from the cold-cathode discharge tube, operating on an induction coil provided with mechanical rectification, to the modern water- or oil-cooled Coolidge tube supplied with a valve-rectified current at 700,000 volts.

The nature of x-rays remained a secret for considerable time, but it gradually became recognized that they were of the nature of light. There remained, however, the difficulty of reflecting, refracting and diffracting x-rays, all of which were possible with ordinary light. It was felt that if x-rays were electromagnetic in nature, like light, then it should be possible to produce interference phenomena and, consequently, to measure the wave length of the radiation. No grating could be made fine enough to produce interference fringes, but with the work of the Braggs, Laue, and others it became known that the planes of atoms in crystals could be used as a natural grating to produce the required effect.

It is now universally accepted that x-rays constitute a part of the complete electromagnetic spectrum, ranging from long-wave wireless waves at one end to cosmic rays at the other. This spectrum is shown in Fig. 1.

There is a very important property of x-rays which should be considered here, namely, the ionization of a gas, for this procedure has provided a basis for defining and measuring the intensity of a beam. Ionization is the making of a gas a comparatively good conductor of electricity by the formation of electrically-charged particles (positive and negative) in the gas, which particles move under the influence of an applied electric field, those positively charged moving in one direction, while the negatively charged move in the opposite direction, thus constituting an electric current in the gas.

The ionization current produced in a gas by x-rays and an applied electric field is very small, and it is necessary to employ a sensitive electrometer in its measurement. Fig. 4 shows an arrangement for making such measurements. C and D are two parallel plates placed a few centimetres apart, C being joined to the knob of an electroscope. When an electric field is applied across the plates and the gas between them is ionized, a current will flow diminishing the charge on the electroscope and causing the gold leaves to collapse. The rate of fall of the leaves is a measure of the current flowing across the space between the plates, that is, of the amount of ionization produced by the x-rays.

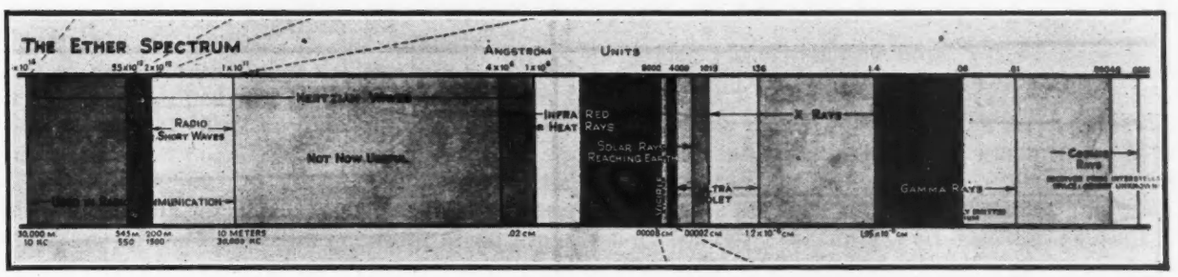
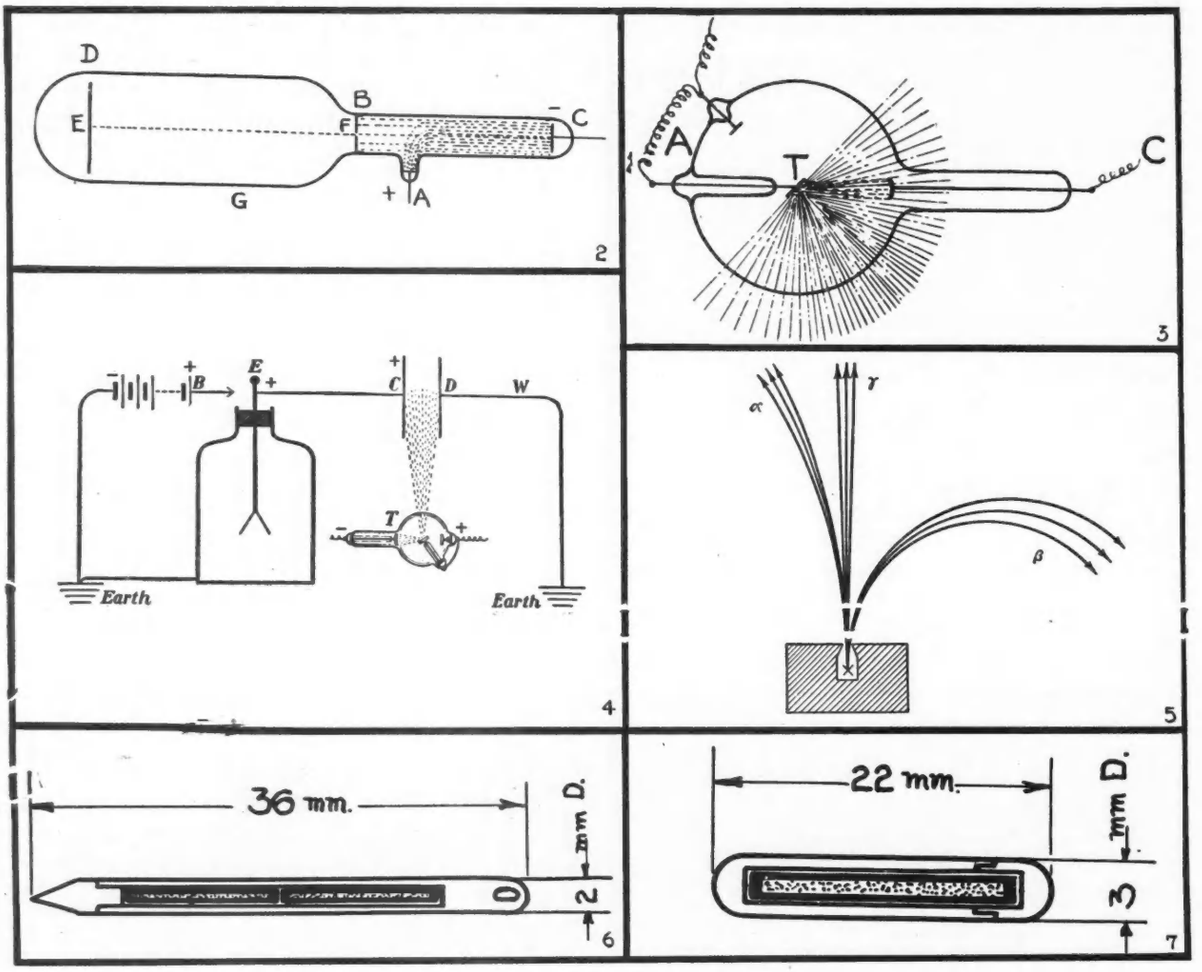


FIG. 1

MODERN CONCEPT OF MATTER

According to the modern theory of atomic structure all matter consists of positive and negative electricity and nothing else. The fundamental unit of positive electricity, called the proton, is equal in magnitude to the unit of negative electricity, the electron, although the mass of the former is 1,850 times that of the latter. Elements differ only in the number and arrangement of these fundamental charges in their atoms. Each element in the Periodic Table has associated with it two numbers, the atomic weight and the atomic number. Every atom consists of a positively charged nucleus, the number of protons in which determines its atomic weight, while the excess of protons over electrons in the nucleus gives the atomic number and decides the chemical properties of the atom. Let us consider two examples. Helium is the second lightest element in the Periodic Table; it has atomic weight 4, and atomic number 2. The nucleus of its atom consists of 4 protons and 2 electrons, hence two free orbital electrons are required to make a neutral atom. Uranium is the heaviest of the elements, its atomic weight is 238, and atomic number 92; hence its nucleus consists of 238



protons and 146 electrons and the number of outer electrons in the neutral atom is 92.

THE DISCOVERY OF RADIUM

Shortly after the discovery of x-rays, Becquerel in Paris was investigating the phosphorescence of minerals. It happened that he put some unexposed minerals into the cabinet in which he kept his photographic plates. Some days later he was surprised to find his plates fogged. Most of us would have suspected the plates, made a complaint to the manufacturer, and let it go at that. But Becquerel, being a scientist, put some fresh plates into the cabinet, left them there for a few days, and found that they, too, had become fogged. By a process of elimination he found that this photographic effect was due to a piece of pitchblende, an ore containing uranium oxide. Madame Curie and her husband investigated this new property of pitchblende, and by chemical means extracted a substance which was found to be much more active than the original pitchblende. This new substance was called Radium. Immediately many investigators appeared in the field, notably, Wilson, Thomson and Rutherford. Out of their work came the theory of ionization and some conception of the modern theory of atomic structure, both of which have been mentioned already.

THE RAYS FROM RADIUM

It was soon discovered that the rays from radium were of three distinct types, called therefore, alpha, beta and gamma rays. They could be separated readily by means of a magnetic or electric field, which forced the alpha rays to one side, the beta rays to the other, and left the gamma rays unaffected.

Fig. 5 illustrates the deflection produced in the rays by a magnetic field whose direction is perpendicular to the plane of the figure. (The deflections of the alpha rays are greatly exaggerated.)

Alpha rays are known to be positively-charged particles identical with the nuclei of helium atoms; beta rays are similar to cathode rays in that they are rapidly moving electrons; while gamma rays are similar in nature to x-rays but have a shorter wave-length.

RADIOACTIVITY

The spontaneous emission of alpha, beta and gamma rays from certain elements is called radioactivity, and such elements are said to be radioactive. It is obvious that, in the light of

our theory of matter, the origin of the alpha and beta particles must be the nucleus of such radioactive elements and that this process of disintegration will result in new arrangements of protons and electrons in the nucleus, giving rise to new elements. In fact, Rutherford, in 1902, put forward this idea in his theory of spontaneous disintegration of radioactive matter, thereby starting much speculation on and investigation of the manner in which the arrangements occurred in all the elements.

Just as when cathode rays stopped by ponderable matter give rise to x-rays, it might be expected that the sudden eruption of electrons from matter would give rise to some corresponding electromagnetic radiation. This is found to be the case, for accompanying the beta rays there are usually gamma rays.

ISOTOPES

As has already been said, isotopes are elements having identical chemical properties but different atomic weights. It appears that the chemical properties of an element depend on the charge on its nucleus, which, as we know, determines its position on the Periodic Table, that is, its atomic number. Therefore we might say that isotopes are elements of different atomic weight but having the same atomic number.

Referring to Table I it will be noted that the isotopes Uranium I and II differ by 4 in their atomic weights due to the emission of an alpha particle by Uranium I.

Uranium X_1 changes to Uranium X_2 by the emission of a beta particle from its nucleus. This change causes the product Uranium X_2 to have the atomic number 91, but no appreciable change occurs in the atomic weight due to the relatively small mass of the electron.

Uranium X_2 changes to Uranium II by the further emission of a beta particle from its nucleus. Thus Uranium II will have the atomic number 92, an atomic weight 234 and will have the same position on the Periodic Table as Uranium I.

RADIOACTIVE DECAY

The rate of disintegration of a radioactive element is constant and unalterable, that is, the number of atoms breaking up in a given time is a constant percentage of the total number present. All radioactive decay proceeds exponentially. For example, if a substance disintegrates to half of its original value in time T then only one-quarter will remain in time 2T, one-eighth in time 3T, and so on. The time T is referred to as the "half-value period". Referring to Table I, it will be noted that the "half-value period" of the various products of disintegration in the Uranium-Radium series has a wide range, varying from millions of years to a small fraction of a second.

THE PROPERTIES OF RADIUM AND RADIUM EMANATION

Radium is always found in nature in such minerals as pitchblende and carnotite. If no loss of radium has occurred throughout the centuries there will be a definite relationship between the uranium and radium content of such an ore. Radium itself belongs to the

TABLE I.

URANIUM—RADIUM SERIES

Substance	*Atomic*		*Symbol*	*Radiation*	*Half Period T*
	Weight	*No.*			
Uranium I	238	92	U I	α	4.67×10^9 yrs.
Uranium X_1	234	90	U-X_1	β	24.6 days
Uranium X_2	234	91	U-X_2	$\beta(\gamma)$	1.15 min.
Uranium II	234	92	U II	α	2×10^6 yrs.
Ionium	230	90	Io	α	6.9×10^4 yrs.
Radium	226	88	Ra	$\alpha(\beta+\gamma)$	1690 yrs.
Radon (Emanation)	222	86	Rn	α	3.85 days
Radium A	218	84	Ra-A	α	3 min.
Radium B	214	82	Ra-B	$\beta(\gamma)$	26.8 min.
Radium C	214	83	Ra-C	99.97% $\beta+\gamma \rightarrow$ C' 0.03% $\alpha \rightarrow$ C''	19.5 min.
Radium C'	214	84	Ra-C'	α	10^{-6} sec.
Radium C''	210	81	Ra-C''	β	1.4 min.
Radium Ω'' (?)	210	82	RaΩ''		∞
Radium D	210	82	Ra-D	$(\beta+\gamma)$	16.5 yrs.
Radium E	210	83	Ra-E	β	5.0 days
Radium F (=Polonium)	210	84	Ra-F (=Po)	$\alpha(\gamma)$	136.0 days
Radium Ω' (=Lead)	206	82	RaΩ' (Pb206)		∞

group of alkali earth metals comprising barium, strontium, calcium and magnesium. It is a pure white metal, and, like sodium, rapidly changes to the hydroxide in contact with water-vapour in the air; hence it is usually prepared in soluble salts such as the bromide or chloride, or in the sulphate or carbonate form as insoluble salts. When radium disintegrates, emiting an alpha particle, the first product is radium emanation which is a gas having a molecular weight of 222. This gas is highly radioactive and emits alpha rays when disintegrating to form radium A, a solid; it will almost completely disappear in 30 days. Radon, as this gas is sometimes called, is one of the group of inert gases such as neon and argon.

It happens that radium C is the element responsible for most of the gamma radiation used in therapy, therefore radon might be used as the parent substance instead of radium itself. In fact this is done for economic reasons, and in certain cases for reasons of adaptability of application. The preparation of radon for therapeutic use will be discussed later.

THE EXTRACTION OF RADIUM FROM PITCHBLENDE

The three main sources of pitchblende at present being developed are at the Katanga Mines in the Belgian Congo, at Joachimsthal in Czechoslovakia, and at Great Bear Lake, Canada. Pitchblende is an ore containing uranium oxide, and is richer in uranium than the minerals carnotite and uraninite. The mineral is usually cobbed at the mine and shipped in bags to the extraction plant.

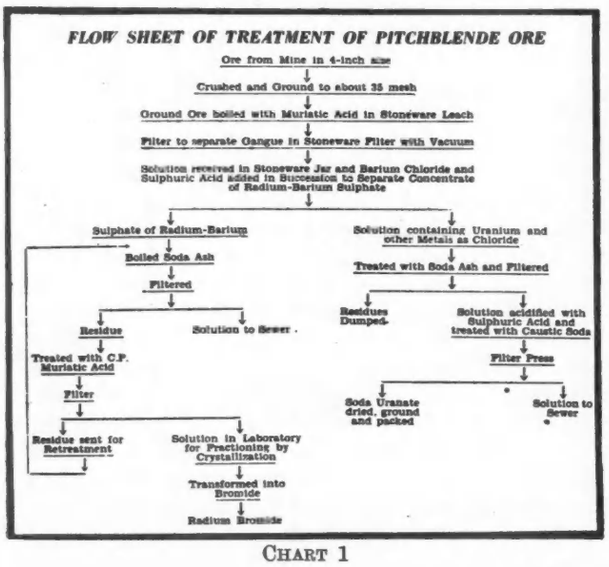

FLOW SHEET OF TREATMENT OF PITCHBLENDE ORE
Ore from Mine in 4-inch size
Crushed and Ground to about 35 mesh
Ground Ore boiled with Muriatic Acid in Stoneware Leach
Filter to separate Gangue in Stoneware Filter with Vacuum
Solution received in Stoneware Jar and Barium Chloride and Sulphuric Acid added in Succession to Separate Concentrate of Radium-Barium Sulphate
Sulphate of Radium-Barium
Boiled Soda Ash
Filtered
Residue
Solution to Sewer
Treated with C.P. Muriatic Acid
Filter
Residue sent for Retreatment
Solution in Laboratory for Fractioning by Crystallization
Transformed into Bromide
Radium Bromide
Solution containing Uranium and other Metals as Chloride
Treated with Soda Ash and Filtered
Residues Dumped
Solution acidified with Sulphuric Acid and treated with Caustic Soda
Filter Press
Soda Uranate dried, ground and packed
Solution to Sewer

CHART 1

Chart 1 shows the various steps taken in the extraction process. The first aim is to obtain a concentrate of radium-barium sulphate. The method is based on the fact that barium and radium are similar in their chemical reactions, and if barium be added to a solution containing radium, then any precipitation of barium in its recovery will bring down the radium with it, even if the radium concentration is below the solubility of pure radium sulphate. The use of barium as a carrier proves most helpful in the initial step of removing radium from uranium, but it presents a new problem, that of separating the radium from the barium. No chemical means is available and we are compelled to resort to some physical means of separation. The method employed is that of fractional crystallization. The radium-barium sulphate concentrate is converted into a chloride or bromide and put into solution. Evaporation is carried on until crystals are formed. These crystals are found to be relatively richer in radium than in barium when compared with the solution from which they were formed. The crystals are removed and dissolved, and evaporation is repeated until new crystals are formed. This fractional crystallization is carried on for approximately 42 days before the product is sufficiently concentrated for putting up in needles and other therapeutic applicators. In actual production a whole series of solutions are evaporated simultaneously at different stages in the separation of the radium from the barium. Chart 2 illustrates the fractioning process.

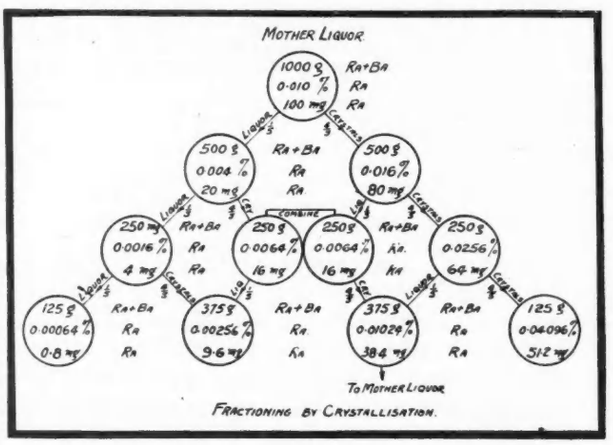


CHART 2

The final product is usually radium bromide or radium sulphate. The bromide, being soluble, is convenient for use in a radium emanation plant, while the sulphate, which is highly insoluble, is used for needles, plaques and other applicators. It is advisable to use the insoluble salt when possible, for there is less likelihood of failing to recover it should loss occur, say in a sewer.

RADIATION IN CANCER

The human body consists of millions of cells, cells which can be seen only when magnified about 500 times. In the normal life of a cell it grows to maturity and then divides into two

cells, each of which in turn grows and divides. Throughout life this growth process is under control, for were it not so we should continue to grow indefinitely. If at some time, usually late in life, a cell begins to divide and the newly-formed cells continue the process we should experience what is called a malignant tumour or growth, often referred to as "cancer". These rebellious cells, free from controlling influence, would multiply and destroy neighbouring tissues if the process were not halted.

It fortunately happens that if x-rays or gamma rays are projected on these cancer cells for some time the latter will be destroyed. The effect may be somewhat analogous to the "photo-electric effect" in which a beam of light will knock an electron out of matter, such as lead. If it were not for the fact that, in general, the normal tissue surrounding a tumour is less radio-sensitive than the tumour itself the use of x-rays and gamma rays would be very hazardous. The main problem of the radiologist is to so apply the radiation that it will most effectively destroy the malignant cells with a minimum of destruction to normal tissue. It follows, therefore, that deep-seated tumours present the greatest problem in radio-therapy, since the rays must penetrate so much normal tissue in order to reach the growth.

Referring again to Fig. 1, it will be noted that the spectrum of gamma rays from radium covers a considerable range in wave-lengths. Now it happens that the absorption of radiation by matter varies with the wave-length, in that the longer the wave-length, the greater is the absorption. Therefore, if a beam of gamma rays be intercepted by a filter the transmitted radiation will have a mean effective wave-length shorter than that of the original beam. This alteration in the quality of a given radiation by filtration is gained only at a sacrifice of total intensity. It is believed that the quality of radiation applied to a tumour plays an important part in the effective destruction of malignant cells; hence the problem of filtration becomes one of primary importance to the radiologist, who must through experience decide what quality to use in any particular case.

The therapeutic use of radium.—Radium is made up in a number of different applicators, such as needles for interstitial use, tubes for intracavitory use, plaques for surface work, and packs or bombs for external application. Radium emanation is also put up in gold seeds for application interstitially, and sometimes in larger amounts for external use in tubes and packs.

Needles.—A typical needle design of average size is shown in Fig. 6. Needles are made of steel, gold or platinum, there being at present an increase in the use of platinum due to the desire for increased filtration without increased wall thickness. Some radiologists prefer to use cell-filled needles, a cell being a small sealed platinum cylinder containing radium in 1, 2, 5 and 10 mg. amounts. If the needle has a removable point the cells may be transferred from needle to needle with as many as 2, 3, or 4 cells in a single needle according to requirements. The use of cells in conjunction with hermetically sealed needles is also good practice, for there is less danger of losing the radium in case of damage to the needle. The points of platinum needles are usually made of a platinum-iridium alloy for the sake of hardness.

Tubes.—Tubes are usually designed to contain 10, 20, 50 or 100 mg. of radium element. Since they are not used interstitially their outside diameter is not so limited as in the case of needles. Tubes may or may not be cell-filled.

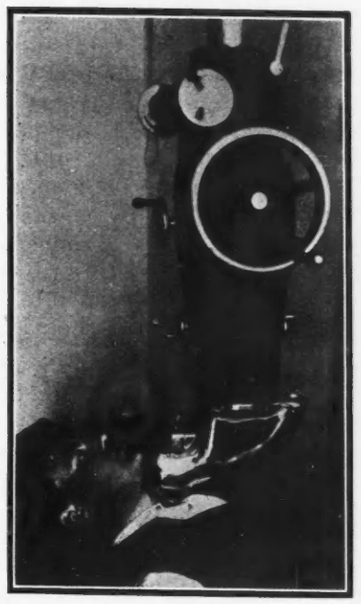


FIG. 8

They may be made of monel metal, gold, or platinum, although here again there is an increase in the use of platinum. A cell-filled tube of average size is shown in Fig. 7.

Plaques.—A plaque is a flat box containing 5 to 20 mg. of radium spread out over a surface 1, 2, 3, or 4 sq.cm. in area. There are two types of plaques, those made entirely of thin metal, and those having a glazed wax-like front. The former has the advantage of being less subject to breakage and leakage, while the latter gives a greater amount of beta radiation. This type of applicator is used much less frequently than needles or tubes, but has a definite place in the treatment of small superficial growths.

Radium bombs.—The application of gamma rays from large quantities of radium at comparatively great focal distances is finding its place in attempts to irradiate deep-seated tumours. This method involves the use of some device for securely holding the radium in any

required position. Such a device is often called a "radium bomb" or "pack".

Many designs of bombs are in use today throughout the world, one of the latest of which is shown in Fig. 8. This one was designed by Dr. R. M. Sievert, of the Radiumhemmet, Stockholm. A duplicate of this apparatus was recently installed in the Toronto General Hospital.

A radium bomb is fundamentally a hollow cylindrical block of lead for holding radium tubes in a flat disc-like container. It is desirable to be able to adjust the port of entry of the radiation into almost any desired position with respect to the patient. The different designs in use vary in a degree of flexibility and methods of obtaining different skin-radium distances and port areas.

Radium emanation.—The unit quantity of radium emanation used in therapy is the millicurie. This is the amount of the gas which will exist in equilibrium with 1 mg. of radium element hermetically sealed in a container. The millicurie has a volume of 0.0006 cu. mm. at 0° C. and 760 mm. pressure. By means of appropriate apparatus the gas is pumped out of a solution of radium bromide in water. After purification it is usually forced into fine gold tubing which is cut into pieces about one-eighth of an inch in length. These small pieces of gold tubing, which contain about two millicuries of radon, are often referred to as "seeds".

Radon seeds are most often applied interstitially, a trocar being used to implant them more or less evenly throughout the tumour mass. Since radium emanation practically disappears in 30 days there can be no harm in leaving the seeds within the tissue. The use of gold instead of glass as the container of the gas has the advantage of providing protection against soft gamma rays and beta rays.

One of the main advantages of radon is economic, in that, with a central supply, various clinics in the locality can be supplied from one source without additional expense. This enables a doctor who treats only an occasional patient to avoid a large capital investment in radium. It is not meant, however, that the use of radium emanation is cheaper than that of radium, for it is easily shown that the most economical use of radium is made by sealing up the element permanently in an applicator.

There is great need for uniformity in reporting dosage measurements in both x-ray and radium therapy. One of the first essentials to a reliable statistical investigation into the efficacy of these agents in the treatment of cancer is that all facts are so described that a given treatment can be repeated in an identical manner with radiation of the same quality as well as quantity in the same interval of time.

Men and Books

THE EARLY DOCTORS OF MANITOBA

BY ROSS MITCHELL, M.D.,

Winnipeg

The story of the very early doctors of Manitoba is inextricably bound up with the fur trade. The first white medical man in the North-West was probably Charles Doullon Desmarets, who spent three years, 1753 to 1756, on the shores of the Western Sea (Lake Superior). He was employed both as surgeon and factor by Chevalier de la Corne who was engaged in the fur trade about Rainy Lake and Lake of the Woods. Ships of the Hudson's Bay Company brought with them surgeons, who in some instances remained in the country for varying periods. The history of these early surgeons can be obtained only by laborious sifting out of old records, and we are much indebted to Dr. H. H. Chown, of Winnipeg, who in his leisure moments extracted the precious material from the mass of archives.

THE SELKIRK SURGEONS

With the coming of the Selkirk Settlers we are on surer ground. Lord Selkirk sent out five groups of settlers for his Red River Colony in the years 1811 to 1815. A surgeon was attached to each party and placed second in command. Mr. Abel Edwards, surgeon, left Stornoway on July 26, 1811, with the first group. After a stormy voyage of 62 days the ship arrived at York Factory too late for the settlers to make the overland trip to the Red River before the advent of winter. In the spring the party travelled slowly over the rivers and lakes and reached the Forks of the Red and Assiniboine on August 18, 1812. Edwards was one of the men named by the Earl to receive the formal transfer of the Selkirk grant of 119,000 square miles from the Hudson's Bay Company on September 4, 1812, the ceremony being conducted with considerable pomp. "Afterwards", as Edwards states in his diary, "we crossed the river and spent the evening with the gentleman of the North West Company at Fort Gibraltar at the Junction". He was one of the first to write on the natural history of Rupert's Land, for in the bibliography attached to "The Geological Formations of Manitoba", published in 1925 by Prof. R. C. Wallace, now President of the University of Alberta, we read "Notes taken during

the summer of 1812 on a journey to Lake Winnipeg and the Red River, by Abel Edwards, surgeon at the Settlement on Red River, together with a description of the specimens collected by Mr. Holdsworth, Surgeon at York Fort. *Trans. Geol. Soc., First Series,* Vol. 5, London, 1821, pages 606-607." George Holdsworth was surgeon at York Factory and later at the Red River Settlement, where, in February 1814, he was appointed member of Miles MacDonnel's Council. It was he who posted a notice of the Hudson's Bay Pemmican Law on the door of the North West Company's post on the Souris, but Mr. John Pritchard, the North West trader at that post, relates that "he did it with courtesy".

The second party in 1812 was accompanied by Dr. Thomas McKeevor, but he did not proceed to the Red River. In 1819, when, on account of the struggle between the two great fur companies, attention was focussed on the North West, he produced a slender volume "A Voyage to Hudson's Bay During the Summer of 1812." Therein he related one of his professional experiences:

> "About twelve o'clock p.m., in consequence of dreadful shouting, I went upon deck, and found every one in the greatest consternation and terror; it appeared we had got in among shoals, and that we had now not more than four fathom water; in a short time, however, we got into ten-fathom, when we cast two anchors. On these depended all our safety; if they gave nothing would have saved us from being driven on shore, when we must inevitably have perished; fortunately, however, they held fast. About ten o'clock a.m., Mrs. McClain was, to the great joy of all on board, safely delivered of a daughter."

The coming of the baby seemed to bring good luck, as he records that "The weather began to clear up and, with the exception of a few showers, it was fine all day."

The third party in 1813 had as their surgeon Peter Laserre, a Guernsey man, nephew of Sir Isaac Brock, a skilled physician and well educated. Unfortunately, ship fever broke out on the *Prince of Wales,* the first time on any Hudson's Bay boat since 1670. Laserre fought the disease as best he could, first on shipboard and later in the camp near Fort Churchill, but there he succumbed. The remaining sick were cared for by Kate MacPherson, aged 26, who died at an advanced age at Kildonan revered by all who knew her as one of the pioneer women of the Red River.

Dr. James White, an Edinburgh graduate who had been Assistant Surgeon on *H.M.S. Beagle,* 1809-1811, came with the fourth party in 1814. He was then 25 years of age. His remuneration was fixed at £50 per annum, with lodging and subsistence for the first two years, and at the end of his term he was to receive five hundred acres of land in the colony. He was appointed a member of Miles MacDonnel's council in July, 1814, and, when MacDonnel surrendered himself as prisoner to the North West Company in 1815, Dr. White became the leader. The coming of the settlers fanned the strife between the Hudson's Bay Company and the North West Company to fever height, and on June 11, 1815, as Dr. White was pacing in the Governor's house, a shot whizzed by him. He headed the settlers who removed to Jack River (Norway House) in the same month. He returned in time to build a new Fort Douglas before Capt. Semple, who led the fifth party, reached the Forks in November, 1815.

With Captain Semple was a Doctor Wilkinson, apparently acting only as surgeon on the voyage, as he is mentioned as private secretary to Semple in the colony. Both Dr. White and Dr. Wilkinson fell with Governor Semple and eighteen others in the clash at Seven Oaks on June 19, 1816.

UNION OF THE TWO FUR COMPANIES

After the union of the two companies in 1821, and under the guidance of George Simpson, the little settlement on the Red River seems never to have been without a medical man. Doctors Todd, Hamlyn, Saunders, Fisher and Hendry are mentioned in old records. William Todd, an Irishman and a former naval surgeon, attended Mrs. George Simpson in her first confinement. In 1831 after having been in charge of Brandon House he was transferred to the new post at Fort Ellice, and later was chief trader in charge of Swan River district until 1843.

Dr. Hendry is referred to in the Minutes of the Council of the Northern District of Rupert's Land, June 8, 1833, as having given a medical certificate of Chief Factor McKenzie's ill health, and Thomas Simpson, writing on December 19, 1831, to Donald Ross, also mentions him: "The Governor (George Simpson) drives tandem at a terrible rate. Mr. McMillan sports a very dashing horse and sleigh and Dr. Hendry, Mr. Ballenden and I, being all well provided, follow in suitable style."

Julian Richard Hamlyn is mentioned in Sir George Simpson's correspondence as "the strangest compound of skill, simplicity, selfishness, extravagance, musical taste and want of courtesy I ever fell in with." In a letter from Thomas Simpson to Donald Ross written at Fort Garry, March 12, 1831, he is again mentioned—"The settlement has been extraordinarily prolific in births this season, and sickness and mortality are very rare. Dr. Hamlyn, however, seems to find plenty of employment. He has two fine horses and is continually galloping about." He accompanied the Governor on his famous trip from York Factory to the Pacific coast. An oil portrait of Dr. Hamlyn is in the City Hall at Winnipeg.

JOHN BUNN—FIRST NATIVE-BORN PHYSICIAN

With 1832 began a new phase of the medical situation. This date marked the return to the Red River of Dr. John Bunn, who had been born in the settlement in 1802 and graduated in medicine from Edinburgh University in 1832. His father had belonged to one of the companies of the City of London, and, as such, was a liveryman. Coming to the Red River settlement he became an officer of the Hudson's Bay Company. In 1835 Dr. Bunn became a member of the first Council of Assiniboia, formed by the Governor to control the affairs of the District of Assiniboia, a territory including all land within a fifty mile radius of the Forks of the

John Bunn

Red and Assiniboine rivers. All members were appointed by the Board of Governors in London. This council was the legislative and administrative body until 1869, when the territory passed from the control of the Hudson's Bay Company.

Dr. Bunn held several other positions, such as Clerk of the Court, Sheriff and Coroner. In the latter capacity he was sent in 1840 to investigate the circumstances in connection with the tragic and mysterious death of Thomas Simpson, Arctic explorer and cousin of the Governor. Dr. Bunn was the "Weelum McClure" of the Red River, and many tales are still told by the old settlers of his wit, his professional skill in emergencies, and his cheerfulness in travelling over wide areas to visit patients, and of his kindness of heart. In summer he rode horseback; in winter he travelled with horse carriole or dog team. Dr. Bunn's sudden death from apoplexy at Fort Garry on the morning of May 21, 1861, occurred at the time of a great flood and the venerable Archbishop Matheson, at that time a boy, recalls with what profound sorrow the settlers assembled at Bird's Hill for a Sunday service received the announcement. Dr. Bunn was attended on this occasion by Dr. Paxton, a surgeon with the detachment of the Royal Canadian Regiment then located at Fort Garry. Dr. Bunn's son, Thomas Bunn, played an important part in the negotiations attending the transfer of Manitoba from the Hudson's Bay Company to the Government of Canada, and a great grandson, Dr. C. R. R. Bunn is a well known practitioner at Red Deer, Alberta.

It must not be thought that it is a new thing for the authorities to provide for payment to doctors for services rendered to indigent patients, since in the Minutes of the Council of the Northern Department of Rupert's Land held at Red River Settlement on June 1, 1833, we read—

> "Dr. Bunn, having attended professionally on many retired servants in the Red River Settlement, *who on account of their indigent circumstances cannot pay for medical advice,* and having likewise administered medicine at several of the Company's establishments and to the families of gentlemen belonging to the service who had been sent to the Red River for the benefit of religious instruction and education during the past year—IT IS RESOLVED 89—THAT in consideration of, and in remuneration for such medicine, services and attendance, a grant of £50 be made to Dr. Bunn for the year terminating 1st. June, 1933."

In the minutes of the Council of 1837 it was further resolved:

> "THAT an allowance of £100 be made to Dr. Bunn for the medical attendance to the Hon'ble Company's establishments at Red River, the retired servants who cannot afford to pay for such and other pauper settlers for the current outfit."

The last resolution was repeated each year until 1843.

DR. DUNCAN, ARMY SURGEON

The threat of war over the Oregon boundary led to the Sixth Warwicks regiment under Lt.-Col. Crofton being sent by the British Government to Lower Fort Garry. The troops arrived in September, 1846, and with them as Medical Officer was Dr. Duncan. In "Women of the Red River" he is mentioned as having built an organ for the first St. Boniface Cathedral. He left the settlement when the troops were withdrawn in 1848.

WILLIAM COWAN

The presence of these troops did much to create respect for law and order in the settlement, and on their departure a number of pensioners were sent out in 1849. On the sailing ship which brought them and the first Bishop to Hudson's Bay (Dr. David Anderson) was their surgeon, Dr. William Cowan. He was a Scotsman who graduated from the University of Glasgow and began practice in that city when Asiatic cholera was raging. He con-

tracted the disease himself, and though he recovered he was so reduced in health that he sought an opportunity to go to British Columbia. The Hudson's Bay Company had no vacancy there, but informed him that the War Office required a surgeon for the pensioners. Later, he joined the service of the Hudson's Bay Company and was physician to their em-

Wm. Cowan

ployees, as well as acting in consultations with other doctors who appreciated his scholarship and medical skill. In 1856 he went to Moose Factory as surgeon in charge of that post; in 1860 he became Chief Trader, and in 1862 he returned to the Red River. Two years later he visited England, and on his return was in charge at Norway House. In 1866 he returned to Fort Garry to be second in command to Governor McTavish. The Governor was an old and very sick man, and much of the responsibility of administration fell on Dr. Cowan. He was in charge of Fort Garry when Riel and his party marched in from the Sale River on November 2, 1869, after having turned back the Hon. Wm. MacDougall, who had come from eastern Canada to be governor of the new Province of Manitoba. Riel's men slipped quietly into Fort Garry, and when Dr. Cowan ordered the two Métis at the main gate to be off they replied that they had come to protect the fort against a danger. To the query, "What danger?" they returned an evasive answer. Dr. Cowan learned that Riel was in charge and sent for him. Riel promised to withdraw his men, but, instead, doubled the guards and, usurping more and more power, finally took possession of all the buildings within the fort and imprisoned Dr. Cowan. The latter was able to escape to the Lower Fort, and thence made his way by York boat to Hudson's Bay, and by ship to England. Later, he returned to Winnipeg, and in 1879 he was chairman of a meeting to organize the Historical and Scientific Society of Manitoba and became the first vice-president. A few years afterward he removed to St. Paul, where he died in 1902. Some of his medical books were donated to the medical library of the University of Manitoba. Dr. O'Donnell, a contemporary, writes of him as "a man of refined tastes and one of nature's noblemen".

(To be continued)

Hospital Service Department Notes

Anti-vivisection Activities Arouse Research Opposition

There is evidence that renewed activity of that group of individuals known as anti-vivisectionists is being anticipated this year. For some inexplicable reason ample funds seem to be available for those who would gladly sacrifice untold babies (usually someone else's) that a few mongrels might continue a precarious existence. Information has been received that the huge sum of five to six millions is to be spent in the United States and Canada during 1935 for purposes of organization, lobbying and propaganda. Model bills against vivisection will be introduced in thirty-two state legislatures this year. Legislation already passed in several states is a serious handicap to physiological and therapeutic research, and further curtailment of studies would prove disastrous to the welfare of many fine research institutions and the excellent work which they are doing. So far radical legislation has not made serious inroads in Canada, but active opposition has made certain fields of research and study quite difficult in at least one if not two Canadian centres.

To assist medical schools and hospitals with research departments the American College of Surgeons has prepared special literature correcting the false impressions disseminated by much of the "anti" literature concerning animal experimentation. One pamphlet, prepared by Dr. Bowman C. Crowell, reviews the many inestimable health benefits resulting from animal experimentation; another, and larger, booklet contains statements by thirty-six outstanding research workers testifying to the value of animal experimentation in medical science and pointing out the humane way in which animals are treated. The contributors include such well-known investigators as Sir Frederick Bant-

All communications intended for the Department of Hospital Service of the Canadian Medical Association should be addressed to Dr. Harvey Agnew, 184 College Street, Toronto.

ing, Alexis Carrel, George Crile, Simon Flexner, Evarts A. Graham, Franklin H. Martin, George R. Minot, William H. Park and many others. The American Hospital Association also has passed a resolution opposing the anti-vivisection proposals, and urging the medical staffs of all hospitals to oppose this serious threat to medical progress.

Information has not been received as to whether or not new legislation curtailing animal experimentation will be introduced in Canada this year, but medical and hospital workers might well keep in mind the advisability of being prepared for such a possibility.

Medical Societies

The Academy of Medicine, Toronto

The Academy of Medicine held its twenty-eighth annual meeting on May 7, 1935. The report of the Honorary Secretary showed the total Fellowship to be 1,039. The reports from the various officers and committees reviewed the numerous activities of the past year. The library now contains 25,248 volumes, an increase of 1,140 for the past year.

The election of new Officers and Members of Council resulted as follows: *President,* Dr. Oskar Klotz, *Vice-president,* Dr. Henry C. Wales, *Hon. Secretary,* Dr. Gordon S. Foulds, *Hon. Treasurer,* Dr. James W. Ross. *Elective Members of Council:* Drs. Gordon C. Cameron, C. E. Cooper Cole, C. H. Hair, R. I. Harris, R. M. Janes, J. C. McClelland, Gilbert Parker, Robin Pearse, J. R. Stewart, G. E. Wilson.

The work of the retiring President, Dr. M. H. V. Cameron, who has just completed a most successful year in office, received many favourable comments.

GORDON S. FOULDS, *Hon. Secretary*

Canadian Association of Clinical Surgeons

The Annual Meeting of this Association was held on March 29, 1935, at the Nôtre-Dame Hospital, Montreal, and was attended by a representative gathering. Dr. B. G. Bourgeois, Vice-president, acted as Chairman.

In all sixteen papers were read to the visitors by surgeons connected with clinical work at Nôtre-Dame Hospital. These papers brought to light some of the work done in the local institution up to the present time.

Among the lecturers were:—Drs. Léo Blagdon, L. C. Simard, L. Guérin-Lajoie, Charles Hebert, Jean Tremblay, Paul Bourgeois, A. Laquerrière, L. Leonard, Paul Bourgeois, P. M. Ricard, A. Ethier, A. Magnan, E. Van Campenhout, Albert Bertrand and Albéric Marin.

Following adjournment at noon, luncheon was served in the Nurses' Home. Later the delegates went to the central division of the Montreal General Hospital where a visit was made to the clinical department. In the evening the members had dinner at the University Club, the next day visited the Royal Victoria Hospital.

The Saint John Medical Society

The regular monthly meeting of the Saint John Medical Society was held at the Admiral Beatty Hotel on April 24. The speaker of the evening was Dr. E. A. Petrie, Radiologist at St. Joseph's Hospital. His paper was a summary of the recent literature on bone disease, with special emphasis on osteitis fibrosa and allied conditions. The paper was illustrated by a film exhibition on recent cases in his service. The attendance was large and discussion was provided by a considerable number of those attending. This lecture completed a series of winter meetings which have been highly successful.

A. STANLEY KIRKLAND

The Winnipeg Medical Society

The regular monthly meeting of the Winnipeg Medical Society was held in the Physiology Lecture Theatre of the Medical College on April 18th. The program consisted of short clinical presentations as follows: (1) "Malaria in Manitoba", Dr. A. P. MacKinnon; (2) (*a*) "Pituitary tumour", (*b*) "Duodenal—colic fistula", Dr. J. C. McMillan; (3) "Lupus erythematosus", Dr. G. B. Bedford; (4) "Optic atrophy", Dr. N. L. Elvin; (5) "Diabetes insipidus", Dr. H. D. Kitchen.

A representative from the Manitoba Medical Association made a statement regarding the Cancer Relief and Research Institute.

ROSS MITCHELL

The eye, which is called the window of the soul, is the chief means whereby the understanding may most fully and abundantly appreciate the infinite works of nature; and the ear is the second, inasmuch as it acquires its importance from the fact that it hears the things which the eye has seen. If you historians, or poets, or mathematicians had never seen things with your eyes you would be ill able to describe them in your writings. And if you, O poet, represent a story by depicting it with your pen, the painter with his brush will so render it as to be more easily satisfying and less tedious to understand. If you call painting "dumb poetry", then the painter may say of the poet that his art is "blind painting". Consider then which is the more grievous affliction, to be blind or to be dumb!—Leonardo da Vinci.

Special Correspondence

The London Letter

(From our own correspondent)

The relationship between the police and the medical profession is an intimate one. On the one hand as ordinary citizens the doctors have their obligations to perform and their position in connection with breaches of the law is the same as for anyone else. On the other hand many aspects of their work bring doctors into special relationship with the police, and for the most part such a relationship is a happy partnership. The opening of a new Police Laboratory in London recently—and in this respect London is behind Edinburgh and Glasgow—was carried out in the presence of leading members of the medical profession, and the curriculum there is under the charge of Dr. James Davidson, lately pathologist to the Royal Infirmary, Edinburgh. Some sixty police cadets, chosen for their promise and experience, will receive sufficient instruction in anatomy, physiology, chemistry and microscope work to enable them to cooperate more efficiently with the experts in these subjects in the detection of crime. As every student of the modern detective novel knows, the present day criminal needs for his detection much more than arm-chair deduction, and the new laboratory should be of great service; in one respect because it will indicate quite clearly the difficulties which confront the medical witness. There is another aspect to the relation between police and doctors which has recently been emphasized and this concerns the question of professional secrecy. If a corpse is found clothed in a certain type of suiting it is customary to circulate all possible tailors in the hope of securing identity. It is quite another matter for all the doctors of a district to be asked to furnish details of any young female patients, for example, who might correspond to a dead body. This course was recently adopted by a chief constable, and the British Medical Association Council was asked as to the correct attitude for the doctors concerned. It seems clear that to refuse to help the police might lead to a difficult situation, and, on the other hand, revealing of patients' names in such a manner might lead to an action for breach of confidence. The law, while refusing to recognize professional secrecy, also refuses to grant any sort of indemnity to doctors who reveal secrets in the interests of the public as represented by a police inquiry.

It is not yet known what steps the House of Lords will take with the Bill for the recognition of osteopaths, but the Select Committee came to an end when the counsel for the promoters of the Bill opened the twelfth day's business by announcing the decision of his clients not to proceed with the Bill. Two things have led to this position. On the one hand the inquiry widened its scope and became, as was inevitable, an inquiry into osteopathy as a whole, although the committee was not constituted to judge the scientific aspects of the matter, and, secondly, it is no use prescribing a set course of training for osteopaths when, as revealed by some of the witnesses, the present school of osteopathy in this country did not altogether satisfy the requirements even of some of the supporters of the Bill. An attempt was made to represent the turn which events have taken as neither a victory nor a defeat for either side, and to assume that the withdrawal of the Bill was conditional upon a new inquiry into the scientific basis of osteopathy being set up. This must rest unsettled until the House of Lords' Select Committee makes its report. To the medical profession the whole affair does seem to represent a rout of the osteopathic forces, but there is left a feeling that possibly all that is good in manipulative treatment has not yet been fully utilized by the medical profession and that if only this comes out of the committee's work it will have been worth while.

The term "pay-beds" is a curious one which has been to the fore recently in connection with new legislation to enable any institution to establish beds for paying private patients despite anything in their charter to the contrary. The term is curious because it lends itself open to the retort by the ordinary patient in the ordinary wards of a hospital that he, too, is paying for his bed. It is true that he may be doing this in an indirect way by being asked to make a contribution to the funds of the hospital, or he may be a subscriber, or he may in certain instances be assessed and be given an account to settle (in the municipal institutions). The real difference is, of course, in that the private patient is charged at a higher rate to cover all the cost and make a profit, and in some ways certain small hospitals can make sufficient profit out of such private patients to assist materially in the upkeep of the whole institution. Then again in such hospitals, as distinct from nursing homes, the private patient may be nursed by only partially trained nurses. The medical practitioner has also a vital interest in the new Bill, for while he has been content in certain instances to allow, reluctantly, his patients to go into a general ward and be under the care of a brother practitioner who is on the staff while he is not, he is unlikely to acquiesce in such a course for a private patient, and if he is to be allowed access here it is not possible to keep him out of the public wards much longer. All these points have to be considered in relation to the new Bill. It is undoubtedly a useful step, but it is only a step towards some coordination of all the hospital services on a better basis.

St. Mark's Hospital, London, has been celebrating its centenary in a modest way. This hospital for diseases of the rectum was founded inside the city of London in a small shop, and it has now developed into the leading institution of its kind in this country. The hospital seeks to enlarge its buildings and is making a centenary appeal. The Lord Mayor of London, who is also President of the Hospital by virtue of his office, held a banquet at the Mansion House on St. Mark's Day to appeal for funds, and the staff of the hospital have issued a volume of collected papers including a history of its work. The region of the body dealt with has always handicapped the hospital from making a strong public appeal, but such a state of prudery no longer exists, and it was noteworthy that the lay press in reporting the Mansion House dinner did not hesitate to refer to the work done at St. Mark's.

ALAN MONCRIEFF.

121 Harley St.,
London, W.1.

The Edinburgh Letter

(From our own correspondent)

The Departmental Committee which is at present engaged in its enquiry into the health services of Scotland has suffered a severe loss in the death of its Chairman, Sir John Dove-Wilson, K.C., LL.D. Since the appointment of this Committee in June, 1933, Sir John has devoted an enormous amount of time and energy in connection with its work. Last year he was one of the members of the Committee who made an extensive tour of the Highlands and Islands area with a view to securing first-hand information as to the working of the medical services in that part of Scotland. He was about seventy years of age and was formerly Judge-President of the Supreme Court of Natal, South Africa. He retired from that position five years ago with the reputation of being one of the most competent and distinguished officers of the South African judiciary. He was Chairman of the Council of Natal University College for twenty years and presided over the Special Court for Treason and Sedition Trials at Johannesburg in 1922. His death, coming at the time when the Departmental Committee has practically completed the task of hearing the extensive and varied evidence of all kinds of medical and lay organizations, is much regretted by the members of the Committee. His unbiassed, judicial mind would have been of the greatest advantage to the Committee in the drafting of its Report, which it is hoped, will be published towards the end of the current year.

The work accomplished by Sir Robert Philip, of Edinburgh, in the campaign against tuberculosis has gained for him an international reputation. At the recent meeting of the Royal Victoria Hospital Tuberculosis Trust held in Edinburgh, Sir Robert remarked upon the need for the further education of the public. "We want them," he said, "to be a nation in arms against this menace of tuberculosis." It depended upon the knowledge of the individual, the household and the community as a whole whether we attained the success which we so ardently desired. He proceeded to say that in 1882 the mortality from tuberculosis in Scotland stood at 331 per 100,000 of the population, and last year it was 75. Was that improvement due to general causes common to all countries? Certainly not. Many European countries were soaking in tuberculosis, and had enormously high mortality figures running into 200, 300, and 400 per 100,000 of the population. It was sometimes said that the older civilizations were not so adversely affected. The older civilizations, surely, were France, Spain, Portugal, and perhaps Austria, and these were the countries where the tuberculosis mortality figures were the very highest. In Denmark the figures were down to 54 per 100,000 of the population, and in Belgium and Holland to approximately similar numbers, these being countries which had made a vigorous onslaught on tuberculosis. In proportion, as we put effort into the fight we secured results both for the individual and for the community.

The Annual Dinner of the Edinburgh Branch of the British Medical Association was held recently in the Scottish House of the Association. The President of the Branch, Dr. McWhan, was in the Chair. The chief guest was the Right Hon. the Earl of Home, K.T., who proposed the Toast of the British Medical Association. The Earl of Home also presided at the ceremony of unveiling a memorial to the late Dr. James Haig Ferguson in the Lauriston Home, Edinburgh. This Home has carried on maternity rescue work in Edinburgh for the past twenty-six years. The memorial takes the form of a plaque bearing in bronze a relief portrait of Dr. Haig Ferguson. The memorial was unveiled by the Dowager Countess of Moray, and commemorates Dr. Haig Ferguson's long association with the Home of which he was one of the founders. A sum of over £3,000 was subscribed, and this will be used principally to form an endowment fund towards the upkeep of the Home. The Earl of Home in an address said that Dr. Haig Ferguson was a skilful and learned surgeon, a warm-hearted consultant and comforter, a wise and patient teacher, a cultured and tolerant Scotsman, and the best and kindest of friends.

The Medical Superintendent of the Royal Infirmary, Edinburgh, Colonel G. D. St. Clair

Thom, C.B., C.M.G., C.B.E., M.B., C.M., died suddenly in Edinburgh on April 7th. He was educated at Edinburgh University, joined the Army Medical Service in 1894, and took part in the South African campaign, where he was in charge of a large general hospital. He then spent ten years in India. It was as Assistant to the Deputy Director of Medical Services in the Dardanelles campaign that Colonel Thom found an outlet for his great gifts as an administrator. He was at Anzac or in Mudros from the beginning to the end of the campaign. At Anzac the responsibility for all the arrangements with regard to the care of the wounded on the beach and their conveyance to the hospital ships was in his hands. He also took part in the North Russian Campaign in which he was for some time D.D.M.S. of the Allied Forces. In 1923 he was appointed to the Superintendentship of the Royal Infirmary. His efficiency and tact in the administration of this great voluntary hospital was chiefly responsible for its smooth working.

R. W. CRAIG.

7 Drumsheugh Gardens,
Edinburgh.

Letters, Notes and Queries

The Doctor and His Library

To the Editor:

The writer of this article has no desire to conceal his interest. He is the manager of the Medical Department of a prominent Canadian publishing house, but that position need not give him such a bias as to render useless everything he has to say.

The problem of the Doctor and his library seems to be the establishment and maintenance of certain standard reference works, a supply of current literature, some sort of annual summary of new work, and a number of monographs on special subjects. This of course represents only a bare minimum and is generally supplemented in various ways. The difficulty seems to centre round the choice of journals, the annual summary, and the monographs. No class of professional man has suffered more through the depression than the doctor, and this fact has inevitably reduced the possibility of any expenditure on books to a minimum; further, the writer's experience has been that most doctors feel that book prices are too high.

One complaint, however, always seems to us incomprehensible, and that is the grumble voiced with astonishing frequency that a volume is too expensive for its size! Price is only very slightly influenced by bulk. Price depends on paper, binding, illustrations, printing, royalties, office overhead, commissions, excise duties, and freight costs, and of these the quantity of paper is so small an item as to be almost negligible. The really dominating factor in setting a price is the available market; on this hinges almost every item in the above list. The greater the probable demand, the larger the edition possible; that is a truism, but it represents the crux of the problem in Canada, and applies not only to books originating here but to those imported as well. The larger an order an importer can place the better price he can get and the less he needs to charge. Our market is small — some 10,000 doctors are registered in all Canada. Of these the French-Canadian doctor may be eliminated from the point of view of any medical work in English, because, perfectly rightly, he prefers his texts in French. This is by no means a criticism; it is a plain statement of fact, and it reduces the available Canadian market to approximately 7,000. But, out of these 7,000 must be deducted the various groups of specialists whose interest is of course limited to their own field, thus again reducing the market.

Any mail order house will declare that 1 per cent is a good return on any circular, and on this basis it is obvious that 100 copies of even an unusually popular book is the utmost reasonable expectation by this method of sale, while for a work written for specialists the possible sales are reduced to a very small number indeed. Now comes a question that we feel can fairly be put. What do you want your publisher to do? Do you want him to send round a traveller, do you want him to conduct a mail service, or do you want him to advertise in your journals and exhibit at your conventions?

We wonder if you ever stop to think of the traveller's problem. (Some of you do as we well know and gladly testify). Usually he finds it almost impossible to see more than four or five physicians in any one day because most of them are on calls all the morning, and during office hours he must wait till you are free for a moment between patients. How is that man to make a decent living out of his commissions? The publishers are all seriously trying to conduct their business on ethical lines, but none of them is able to send out salaried salesmen. It can't be done. A very slight concession on your part, however, would immensely simplify that man's task. If you would consent to see him in your office or at home before or after office hours, so that he could make definite appointments it would clarify the situation very significantly. Your mind would then be on the books he is demonstrating and his would be at far greater

Answers to questions appearing in this column should be sent to the Editor, 3640 University Street, Montreal.

ease, tremendously lessening the temptation to him to employ "high pressure" methods, which no reputable publisher ever encourages.

Possibly your preference would be for mail service. We wonder just how close to your desk is your waste-paper basket? Too often it seems to be almost perilously handy.

Perhaps you will say "Advertise in our Journals". This of course we all do, but, quite frankly, the traceable returns are very small.

I am anxious to acknowledge the support you give to exhibitors at your Convention, but again you must admit that the volume of sales is far from large.

We believe that medical publishers are seriously concerned to serve their public as best they can, to identify their interests mutually, and to regard themselves, and secure the regard of the profession for themselves, as a group of assistant advisers, whose business it is to collect and distribute technical information for the use of their customers. Therefore we feel that you will welcome this discussion of costs, voiced, not as a complaint but in explanation. "The man on the road" bears the brunt of your grumbles. He it is who wears holes in the floor coverings of your waiting rooms, and he it is who is concerned directly to supply your needs, believing that you appreciate his service. Occasionally from him you may get agreement that prices are high. This is our attempt to show you that they are not unreasonably so; in fact they are maintained at a minimum level in view of all the cost factors, and we write to secure the goodwill, cooperation and appreciation you will readily accord to us who are honestly trying to supply your needs and earn a living for ourselves in so doing.

"AS ONE THAT TRAVELLETH"

Topics of Current Interest

Multiple Births

Probably no five babies have ever received such concentrated attention from the public at large as the quintuplets born about two months ago to a Canadian mother. Thus the general subject of plural births has come into prominence; such births constitute indeed one of the more remarkable phenomena in the physiology of human reproduction. It just so happens that in the human species by far the most common number of births at one confinement is one. But, although the number born at one confinement is in the great majority of cases thus limited, and is both lower and less variable in our species than in the case of most other mammals, a certain degree of variation does exist, and is found to obey, at least roughly, some kind of a law. As plural births go, twins are fairly common, 1 in 87 confinements giving rise to twins. But the scarcity of plural births goes up very fast with the number born at one confinement. It has, in fact, been pointed out by W. W. Greulich of the University of Colorado that the scarcity increases approximately like the powers of 87; while 1 confinement in 87 brings twins into the world, triplet births would be expected about once in 7,569 confinements, this number being the square of 87; and quadruplets once in 658,503 births, this being the cube of 87. If this law continued for higher orders of plural births we should expect quintuplets once in 57 million confinements.

How do these theoretical figures compare with those actually observed in the United States in the five-year period 1926 to 1930? Actually there was one pair of twins per 86.3 confinements, one set of triplets per 8,745 confinements, and one set of quadruplets in 552,000 confinements. There were within this period of five years no quintuplets, as indeed might have been expected by the rule, since the total number of births in these five years was only about 10 million, and the rule calls for quintuplets only once in 57 million or say about once in 30 years. Thus it will be seen that in a very rough way the figures for the five-year period, 1926 to 1930, follow Greulich's rule cited above. Perhaps it should be pointed out that anything like close agreement cannot possibly be expected, because with such rare events as the birth of quadruplets and quintuplets a very large sample would be required to obtain a reliable average figure.

That the numbers cited above are by no means purely numerical curiosities is at once seen when similar observations are extended to other countries. Unfortunately, the variations in the manner of recording births, especially as regards the complicating factor of stillbirths varies so greatly in different countries that only a few comparisons are possible. However, the following figures can be cited. In Germany, for the eight-year period, 1922 to 1929, there was one pair of twins in every 84 confinements, one set of triplets in every 8,586 confinements, and one pair of quadruplets in 679,446 confinements. In Switzerland, over the seven-year period 1926 to 1932, the corresponding figures were twins in 80, triplets in 7,038, and quadruplets in 492,629. Lastly, in Canada, from which the present stir regarding plural births originates, the birth records from 1923 to 1931 show one twin birth for every 82 confinements, one triplet for every 7,748 confinements and there was one quadruplet birth in about every million confinements. No quintuplets were born during the nine-year period studied. This is only parallel to our own experience, for within our Registration Area in the ten-year period 1923 to 1932 there has not been a single case of quintuplets in the approximately 21,000,000 confinements falling within this period.

Does plural birth handicap the child's chance of life? Quite naturally one would expect this to be the case, and, in point of fact, the records do in some degree bear out this supposition. In the total births that took place in the 10 years 1923 to 1932 in the United States, among those born at a single birth, 96 per cent were born alive; at twin births, only 92 per cent were born alive; at triplet births, 86 per cent, and at quadruplet births, only 72 per cent. There is thus a continual graduation, as the number at one confinement increases, culminating in a very marked handicap against the quadruplet child being born alive. Viewing these figures we are all the more pleased to recall that the quintuplets born to the Canadian mother two months ago, and born prematurely at that, fared so well and are all still alive today, thus establishing a record without precedent. It is very pleasing to think that their survival is in no small degree due to the sympathetic care and to the excellent medical attention, in the full light of medical science, which they have received.—Statistical Bulletin, Metropolitan Life Insurance Co., 1934, **15**: 1.

Multiple Births

Man usually comes into this world as he leaves it—alone. That is why the Dionne quintuplets create such interest.

Double births are common enough so that you probably have among your own acquaintances at least one pair of twins, but births of numbers larger than two are extremely rare. Not over about 35 authenticated cases of the birth of quintuplets, like the Dionne set of five, have been recorded in medical history. Not over a half dozen cases of the birth of six infants at one time are known to science. Such multiple births have been reported much oftener, and newspaper dispatches from foreign parts have recently told of cases of six, seven, eight and even ten infants born on a single occasion. Such reports, however, are usually from great distances, and are without verification. Scientists suspect either a garbling or exaggeration in the transmission of the tale, or a more or less deliberate hoax.

For those who have studied human anatomy believe that if more than six children were crowded together within a single mother, they must of necessity be so small that they could not possibly survive, unless it should be with the most modern methods of care for premature and under-developed infants. Nevertheless, in the old town of Hameln, famed for its Pied Piper and the children who flocked after him, a tablet on the front of a house commemorates the birth of seven children at one time at 3 o'clock in the morning on January 9, 1600. This tablet's inscription may have been a slight and pardonable exaggeration on the part of some early booster committee or Chamber of Commerce, or it may be a fable like that of the Piper himself or the story of Lady Margaret, Countess of Holland, who is reputed to have given birth in 1313 to no less than 365 children at one and the same time.

The survival even of quadruplets is extremely rare. So far as is known, the lovely Keys girls, now distinguished students in Baylor University, Texas, are the only quadruplets who have grown to adulthood in this country. The Dionne quintuplets are the only ones positively known to have had even one of their number live as long as ten weeks.

Scientists, whether they are physiologists, psychologists, educators, or physicians, have much to learn from the five Dionne babies. The longer these five children born at a single birth survive, the more remarkable is the opportunity they offer to those who wish to know more about the human race.

The part that heredity plays in determining the course of daily life, from the psychological point of view as well as the physical, is one problem that these little girls may help to solve.

Twins—and also quintuplets—may be of two kinds. What are known as identical twins have their origin in a single egg cell which becomes separated into two individuals very early in the embryonic development. These identical twins have exactly the same heredity from both father and mother. They look so exactly alike that even their parents have difficulty in telling them apart; they are similar in intelligence, in tastes and in interests. They are subject to the same diseases so far as these, or a tendency toward them, are hereditary. Any differences observed between identical twins are known to be the result of environment, of their individual experiences, accidents, or opportunities.

But a great many twins are not of this identical type. They do not come from a single egg cell, but are merely ordinary brothers or sisters who happen to be born at the same time. Often they are not at all like each other either in appearance or in character. They may not even be of the same sex.

By comparing identical twins and non-identical, or fraternal, twins, by noticing how the former differ and how the less closely related pairs resemble each other, scientists can arrive at deductions regarding the part played by heredity and environment. Any careful scientific experiment, however, needs a "control". In order to be sure that the identical twins resemble each other in some respect more than would ordinary brothers in the same family, it is necessary to compare them with other brothers. In the case of twins, the brothers are, however, older or younger and are brought up under slightly different conditions. Triplets, quadruplets, and quintuplets may offer the ideal control the scientists seek.

The Dionne quintuplets may be related to each other in a number of different ways. Two of them may be identical and the rest fraternal. There may be two pairs and a single "odd" one. Or they might conceivably be all fraternal, although this is not at all likely. It is not possible to tell as yet just what the relationship is. One indication of a single-egg origin lies in the report that only one nourishing organ was observed for all five infants. This evidence is not conclusive because of the fact that in the confusion of such a complex delivery a mistake might have been made, and because even when a multiplicity of such organs exists they sometimes grow together so that they seem to be only one. At birth, identical twins may be just as different in appearance as are fraternal twins, so that the difference in size and weight of the Dionne infants is not an indication that they are not identical. But as they grow older, these differences become less obvious in identical twins, more obvious in those who are non-identical. After the Dionne babies have passed through the first years of their lives, measurements of their bodies, the colour of their hair and eyes and texture of skin, the grouping of their blood, the scores they can attain on mental tests, and their fingerprints will disclose definitely whether they are identical or not.

The little Dionne quintuplets share with thousands of American infants the perils of starting life in an incubator. A large hospital having over a hundred births a month will have about one infant a month that comes into the world so tiny and frail that it must be placed within the mechanical mother to cherish the spark of life within it. The normal child weighs about seven pounds at birth, and all infants weighing less than five pounds are candidates for the incubator. The Dionne babies were born about two months early, and because there were so many of them they weighed much less than the ordinary premature infants; their combined weight was reported as only 13 pounds, 6 ounces. Babies in the incubator, as a rule, gain weight rapidly. They are fed on human milk whenever that is possible, and it is dropped into the tiny mouths with a medicine dropper, since they are generally too weak to nurse at first. The total ration is only about two teaspoonfuls every two hours at first, yet that is plenty for such tiny mites. Oxygen must be provided for the breathing of some of the infants. For those who do not require oxygen, ventilation is provided by the open top of the incubator. The temperature is kept constant by electricity, or by some other means where electricity is not available. The incubator is kept much warmer than the air of the ordinary nursery — from 95 to 98° Fahrenheit is considered just right. This keeps the body temperature of the infant at 98 or 99°. The babies must be turned frequently so that they will not develop pneumonia from remaining too long in one position. Occasionally they must be lifted out of the incubator, but, in general, all the care, bathing, feeding, and changing is done right there in the human nest.

The incubator baby is not weighed every day, as is the normal infant, but is weighed every other day, and all those having to do with his care are interested in watching the line on the weight chart turn upward.

Very great success in the saving of precarious lives has resulted from the use of the incubator, which was first designed for use in the Paris Maternity Hospital in 1880. — *Science News Letter,* 1934, **26**: 116.

Quadruplets at Full Term

Dr. H. B. Small, of Ottawa, has been good enough to send us the following item, which has a special interest at the present time.

A Remarkable Case of Obstetrics. Abortion at 2 Months and Quadruplets at full term
By Drs. Edwards and McTaggart, London, Ont.

"On the 21st of July of the present year we were called to see Mrs. S., of this city. Patient of small stature; English by birth; aged 38; average weight 100 lbs.; height, 5 ft. 1 in. She is the mother of four living children, two boys and two yirls — aged 12, 10, 8 and 7 years. There was nothing unusual at any of her previous confinements — never had an abortion before. On examination, we found the abdomen extremely enlarged, and pendulous. We advised support from the shoulders. She told us she was but five months *enceinte,* but from her history we assured her that she was seven months pregnant. Patient always had good health; menses always regular. She last menstruated on December 4, 1882. About 7 weeks from this time she commenced to flow, which lasted for some three weeks; this was accompanied with pain. With a pain, something was expelled, which she described 'as a lump of flesh with blood vessels in it'. To this lump was attached a short 'string'. At this she became alarmed and consulted a medical man, who assured her she had had a miscarriage. From her account, the flow increased for a few days, but finally stopped. From this time until Friday, September 14, 1883, she had been quite well although distressed by the immense size and weight of the abdomen. On the above mentioned date she was delivered of four living children—two boys and two girls. The weight of the males —4 lbs. 9¼ oz., and 4 lbs. 3 oz., and that of the females—4 lbs. 6 oz., and 3 lbs. 13¾ oz. Labour terminated favourably. There was but one placenta, and each cord was inserted at different places on its surface. The quartette are now six days old, all healthy and able to nurse, and all bid fair to live. The mother is doing exceedingly well, having no more exhaustion than if she had had but one child."—From *The Canada Lancet,* Oct., 1883, p. 44.

Medico-Legal

VII.

Rex v. Pocock[1]

Ontario—Right of osteopath to employ prefix "Dr."—Definition of "osteopath"—Drugless Practitioners Act (1925 [Ont.] Chapter 49)—Ontario Medical Act (R.S.O. 1927, Chapter 196, Section 49).

The accused, Pocock, had studied for three years at the American School of Osteopathy at Kirksville, Mo., and had graduated in 1911 with the degree of doctor of osteopathy. On the doors of his office in Toronto were the words, "Dr. Hubert Pocock, Osteopath". In the Toronto telephone directory his name appeared as, "Pocock, Dr. Hubert J., Osteo., C.P.R.Bg." and in the classified advertisements at the end of the directory was an advertisement in the following words, "Dr. Hubert Pocock, Osteopathic Physician, King and Yonge Streets, Graduate of the American School of Osteopathy, Kirksville, Mo., under A. T. Still". The accused's letter-head read "Dr. Hubert Pocock, Osteopath" and his personal cards, "Dr. Pocock, Osteopath".

By the regulations which the board of regents are authorized to make under the statute known as the Drugless Practitioners Act, an osteopath is defined as "any person who practises or advertises or holds himself out in any way as practising the treatment by diagnosis, direction, advice, written or otherwise, of any ailment, disease, defect or disability of the human body, by methods taught in the Colleges of Osteopathy which are giving courses consisting of not less than four years of nine months' instruction in each year approved by the board."

The accused had been admitted to practise osteopathy in Ontario as required by the Drugless Practitioners Act. However, Section 49 of the Ontario Medical Act reads that "any person not registered pursuant to this Act who takes or uses any name, title, addition or description implying or calculated to lead people to infer that he is registered under this Act, or that he is recognized by law as a physician, surgeon, accoucheur or a licentiate in medicine, surgery or midwifery, or who assumes, uses or employs the title 'Doctor', 'Surgeon' or 'Physician' or any affix or prefix indicative of such titles as an occupational designation relating to the treatment of human ailments, or advertises or holds himself out as such" incurs the penalty named in the section. The question for decision, then, was whether an osteopath, though duly qualified to practise as such, was in employing the prefix "Dr." using that prefix as an occupational designation relating to the treatment of human ailments and had therefore brought himself within the terms of Section 49, or whether, as the defence contended, the prefix was only used to indicate the defendant's scholastic attainments. The Ontario Supreme Court, Appellate Division, was of the opinion that the defendant used the word "Dr." as an occupational designation and that the addition of "osteopath" simply indicated the method which he, professing to be a doctor, in the sense in which the word is ordinarily understood, used in the treatment of such ailments. He was therefore guilty of an infringement of the Ontario Medical Act, and this irrespective of the fact that he had been referring to himself and had been entitled to refer to himself, as a doctor some time before the Act came into force. It is perhaps unnecessary to emphasize to the practitioner that this case embodies the law of Ontario, which may or may not be similar to that of other provinces.

G.V.V.N.

1. A judgment of the Ontario Supreme Court, Appellate Division, reported in (1928) 2 D.L.R. 937.

VIII.

Rex v. Pocock[2]
Rex v. Ellison[2]
Rex v. Lowrie[3]

Ontario—Right of osteopath, chiropractor, and optometrist to use the designation "Doctor" or "Dr."—Drugless Practitioners Act (1925 [Ont.] Chapter 49)—Optometry Act (R.S.O. 1927, Chapter 215)—Ontario Medical Act (R.S.O. 1927, Chapter 196).

Little comment on these cases is necessary. The decision in *Rex v. Pocock,* rendered by Middleton, J. A., was given in a prosecution against the same osteopath as in the case summarized above. Said the judge, "this gentleman, by his training in the Osteopathic College, has become qualified to treat human ailments by the system of medicine or treatment taught in that college, and this is his occupation, and the designation 'doctor' conferred upon him by this college is his occupational designation. Our Legislator has chosen to probit the use of the term 'doctor' as an occupational designation by any one other than those registered under the Ontario Medical Act. This may in some cases produce hardship—but, once the legislative will is expressed, it must be obeyed".

In *Rex v. Ellison* the same judge held that a chiropractor had no right to use the prefix "Doctor" or "Dr".

The same point arose in connection with an optometrist, in *Rex v. Lowrie.* The accused had been granted the degree of Doctor of Optometry by the Royal College of Science, Toronto. It

2. Ontario Supreme Court, Middleton, J. A., in Chambers, reported in (1927) 4 D.L.R. 483.

3. Ontario Supreme Court, Hodgins, J. A., (1932) 4 D.L.R. 806.

was suggested by his counsel, in defence of his use of the title "Doctor", that it was an academic title, and, secondly, that the accused did not in his work treat human ailments. On the authority of *Rex v. Pocock* it was held that such a prefix used by an optometrist was an occupational designation and not an academic title. On the second point the learned judge held that optometrists do treat human ailments. The appeal was therefore allowed and the case remitted to the Magistrate to impose sentence on the accused.

G.V.V.N.

Abstracts from Current Literature

Medicine

The Changing Cause of Death in Diabetes Mellitus. Flynn, J. M., *Am. J. M. Sc.*, 1935, **189**: 157.

Flynn has made a study of the fatal cases of diabetes mellitus occurring in the Peter Bent Brigham Hospital, Boston, in the ten-year period from 1923 to 1933, and has contrasted it with the pre-insulin period up to 1923. The causes of death from 1913 to 1922, as proved by necropsy, were, in percentages, coma 11, sepsis 38, cardiovascular disease 24, pulmonary tuberculosis 19, and unusual complications 8; whereas, from 1923 to 1933 the figures were as follows, coma 5, sepsis 28, cardiovascular disease 49, pulmonary tuberculosis 7, unusual complications 11. The figures show that coma and sepsis have decreased in frequency since the introduction of insulin, whereas cardiovascular disease has increased, possibly due to the longer expectancy of life since the introduction of insulin, though they believe that present methods of treatment have no effect upon the form of cardiovascular disease which is seen in diabetes. The mortality rate of new cases of diabetes did not greatly change after the introduction of insulin. In pre-insulin days the mortality was 9 per cent, as compared with 7 per cent during the period of insulin.

E. S. MILLS

The Selection of Cases of Thrombo-Angeitis Obliterans and other Circulatory Diseases of the Extremities for Sympathetic Ganglionectomy. Brown, G. E., Craig, W. McK. and Adson, A. W.; *Am. Heart J.*, 1934, **10**: 143.

This article expresses the views of the authors on the application of sympathetic ganglionectomy to diseases of the circulatory system. The importance of recognizing that both obstruction and vasomotor components contribute to diminished circulation is stressed. Adequate selection of cases is especially important in occlusive diseases of the arteries, the diminished circulation being a result of two factors, namely, recurrent segmental occlusion by thrombosis and abnormal vasoconstriction in the non-occluded arteries in the primary and collateral circulation. The method advocated by the authors to determine the amount of vasoconstriction in the limbs is the induction of non-specific fever. Triple typhoid vaccine is injected intravenously and the temperature of the mouth and the surface temperature are measured every thirty minutes during the fever. From the data obtained three points are noted, (*a*) the vasomotor index; (*b*) the vasomotor range; (*c*) the maximal vasodilation level.

Many methods of procedure have been studied, such as the exhibition of a variety of drugs, but the best results were obtained with fever or anæsthesia. In such diseases as arthritis and early Raynaud's disease, which are purely vasospastic, pre-operative procedures are not necessary for prognosis, but in occlusive disease this is important. Among occlusive diseases ganglionectomy has its widest application in thrombo-angeitis obliterans. Sixty-seven cases of thrombo-angeitis obliterans on which lumbar ganglionectomy was done in 55 and cervicodorsal ganglionectomy in 12 are presented. Other cases presented are 13 of Raynaud's disease, 24 of scleroderma, and 18 of arthritis. The authors conclude that only about one-third of the cases of thrombo-angeitis obliterans are suitable for operation. A close approximation is shown between the values obtained with non-specific fever and those following ganglionectomy. The correlation was higher in the feet than in the hands. The importance of other factors in the selection of cases is mentioned, such as the integrity of the coronary arteries, the rate of progression and stage of the disease and the ability to demonstrate healing and relief of pain by medical measures.

W. H. HATFIELD

Comparative Values of Several Antidotes in Cyanide Poisoning. Chen, K. K., Rose, C. L. and Clowes, G. H. A., *Am. J. M. Sc.*, 1934, **188**: 767.

As a result of experiments on dogs the authors were able to show that an antidotal action against cyanide poisoning is possessed by methylene blue, sodium thiosulphate, sodium tetrathionate, amyl nitrite, and sodium nitrite. An increase of this antidotal action is obtained when a nitrite or methylene blue, on the one hand, and sodium thiosulphate or tetrathionate, on the other, are successively administered. They found that the highest antidotal action was exhibited by the combination of sodium nitrite and sodium thiosulphate. Under the most favourable conditions in dogs this combination detoxifies twenty minimal lethal doses of sodium

cyanide, and is ten times as effective as methylene blue. It is effective even in the late stages of cyanide poisoning. As regards human cases of cyanide poisoning they suggest the following treatment: (1) immediate administration by inhalation of amyl nitrite for 15 to 30 seconds, repeated every 2 to 3 minutes until syringes of antidotal solutions are obtained; (2) intravenous injection of sodium nitrite at the rate of 2.5 to 5 c.c. (0.3 g. in 10 c.c. of water) per minute, followed by sodium thiosulphate (25 g. in 50 c.c. of water) at the same rate; (3) gastric lavage if the poison is taken by mouth. When signs of poisoning persist, or reappear one hour after the initial dose, the nitrite and thiosulphate may be repeated. A second injection may be given two hours after the first for prophylactic purposes, even if no symptoms are present. Since the writing of the paper the authors found records of two cases thus treated with recovery in both.

E. S. MILLS

Sickle-cell Anæmia in a White American Family. Cooke, J. and Mack, J. K., *J. Pædiat.*, 1934, **5**: 601.

Sickle-cell anæmia has been known for some years to exist in the negro race, and sickling of the cells without anæmia has been found to be present in from 5 to 10 per cent of that race. For some time this peculiarity was thought to be limited to the negro, but has since been found in a Greek family, in an Arab, a Cuban, an Italian, and in a white child of Scotch-Irish parentage. The present authors report it in a family which for four generations at least was known to have no admixture of negro blood. The two children affected were the youngest of six; the other four and the mother were normal. The father was shown to have sickling of the blood, but without any anæmia. The youngest child, a boy, had had an enlarged spleen and anæmia since the age of ten months. Transfusions brought about improvement, but the condition soon became as severe as before. He was small, undernourished, with a spleen reaching to the umbilicus, with 28 per cent hæmoglobin, one million red cells, which showed anisocytosis and poikilocytosis, with but few normoblasts. Splenectomy was performed, and there was a temporary improvement, but soon after the operation the red blood cell count fell again. At this time there were many normoblasts.

At this time the three year old sister was seen for a low-grade fever and drowsiness. She was extremely small for her age, had always been very pale, although mentally alert and well proportioned for her size. She weighed only 19 pounds and was but 32 inches high. The liver was palpable; the spleen was not. There was 35 per cent hæmoglobin, with 2,500,000 red cells. Normoblasts were present in large numbers, and the film suggested the picture of sickle-cell anæmia, although there was no sickling. The films were left for 24 hours to see if there was slow sickling, and after this time the film showed a large number of sickle cells. Having made the diagnosis in the sister, the blood of the younger brother was examined for slow sickling, and he too was found to exhibit this condition. The father showed slow sickling, but no anæmia. The suggestion is made that in white children showing anæmia the possibility of sickle-cell anæmia should be kept in mind, and the wet blood film examined after 24 hours for possibility of slow sickling.

MADGE THURLOW MACKLIN

Surgery

Staphylococcic Empyema and Pyopneumothorax. Neuhof, H. and Berek, M., *Arch. Surg.*, 1935, **30**: 543.

There are few references in the literature regarding the significance of pulmono-pleural lesions due to the staphylococcus. The authors believe that there are distinctive features in the pathogenesis and pathological changes, and in the treatment of staphylococcic pulmonopleural suppuration. Because they observed the unusual frequency of staphylococcic empyema in very young infants in their service at the Mount Sinai Hospital, New York, they examined all the bacteriological reports on all the cases of empyema from 1928 to 1932.

Of 373 patients 182 were children and 191 adults. Of these 5.7 per cent were adults, and 17 per cent were children under 13 years, with staphylococcic empyema. Fifteen of the 21 cases of empyema in infants under one year were of this type. Half of all of the cases in their series occurred in children in the first year of life.

The two most likely sources of the focus or foci in the lungs are the bronchial tree and the blood stream. The evidence for an embolic metastatic origin of the staphylococcic abscess of the lung is sometimes clear. Definite portals of entry for general staphylococcic invasion were noted in 22.5 per cent of the children and 45.5 per cent of the adults. The sites were chiefly active or subsiding skin infections. In staphylococcic empyema, the pathological process in the underlying lung determines the character and the extent of the pleural lesion, which may be single or multiple. The solitary abscess may be comparable to the staphylococcic carbuncle or to the osteomyelitic abscess of the bone. In the authors' series all of the patients presented suppurative pleuritis at the site of the carbuncle of the lung. The characteristic lesion in childhood, and, more particularly in infancy, is wide rupture of a staphylococcic abscess of the lung into the pleural cavity. The childhood types (1) total or subtotal empyema, with or without mediastinal

tension, and (2) total or subtotal pyopneumothorax, with or without mediastinal tension, are characterized by severe mechanical disturbances, such as dyspnœa, cyanosis and tachycardia, if there is tension on and shift of the mediastinum. Most urgently requiring relief is the early rupture of the lung abscess in infants or in young children.

In children closed drainage is employed. In the adult, treatment is rarely urgent. Complete opening of the empyema through a liberal incision is advised. Drainage of the underlying lung abscess may be required.

G. E. LEARMONTH

Collective Inquiry by the Fellows of the Association of Surgeons into Gastro-jejunal Ulceration. Wright, G., *Brit. J. Surg.*, 1935, **22**: 433.

This inquiry analyzes gastric lesions into three main groups — duodenal ulcer, gastric ulcer, and carcinoma. In this way, it is possible to arrive at some reasonable estimation of the risks in the various operations for different lesions.

Reports are given of 2,051 traced cases of duodenal ulcer and 1,382 traced cases of gastric ulcer. The lowest incidence of gastro-jejunal ulcer was following the operation of gastric resection, except in those cases where the operation of Billroth No. 1 was done. The highest incidence of ulceration followed anterior gastro-jejunostomy with entero-anastomosis.

The symptoms of secondary ulceration are: pain, vomiting, diarrhœa, wasting, hæmorrhage, and tenderness on palpation. The pain is usually severe, widespread, and its relationship to food is not always constant. Vomiting occurs in half the cases. Diarrhœa is not always present and, in fact, the patient is sometimes extremely constipated. Wasting appears in almost half the cases, and tenderness on pressure in more than half the cases.

X-ray diagnosis was made on the following appearances or combination of appearances: delay in emptying the stomach; tenderness; residue; deformity or stenosis of the stoma; crater; gastro-colic fistula; deformity in the jejunum; and ulcer of the stomach.

Gastric juice is essential for the production of chronic secondary ulcer. Stagnation or interference with the exit from the stomach or anything which prevents reflex of bile and pancreatic juices definitely increases the liability to secondary ulceration. Operations, en-Y and with entero-anastomosis, should not be employed in the treatment of ulcer cases.

Complications of gastro-jejunal ulceration are — acute and chronic perforation, fistula into the colon, perforation into the abdominal wall, and perforation into the mesocolon.

The treatment of secondary ulcer consists of operation, reconstruction of the normal alimentary canal, new gastro-enterostomy, entero-anastomosis, various methods of gastrectomy, Devine's operation, laparotomy (breaking down adhesions). Gastrectomy offers the best chance of a cure, with a percentage of about 60. Posterior and anterior Polya operations are much in the majority. In Devine's operation the principle is good and should be successful, although there are only a small number of reported cases.

Gastro-colic fistula receives special attention. The symptoms are pain, vomiting, diarrhœa and wasting. The last three are especially prominent, and if the patient has fæcal vomiting or foul eructations the diagnosis is confirmed. The pain often subsides with the onset of vomiting, etc. It is imperative that gastro-colic fistula be treated by operation, and this may be most formidable. In simple cases, procedures akin to those employed in ordinary secondary ulcer are used. Sometimes it is possible to close the fistula in the colon, with restoration of the normal alimentary canal. In others, the colon must be resected and the ulcer attacked. It may be necessary to do end-to-end union of the jejunum, resection of the colon, resection of the stomach and anastomosis to the intestine. Double-ended colostomy may avoid a dangerous part of the operation. Gastro-jejunal ulcer (secondary ulcer) is a very serious post-operative complication. In this article the author gives a mortality rate of 22.7 per cent. This includes operative deaths and those who died from secondary ulceration, though not the result of operation.

S. A. MCFETRIDGE

The Treatment of Causalgia by Thoracic Sympathetic Ganglionectomy. Kwan, S. T., *Ann. Surg.*, 1935, **101**: 222.

Causalgia is a condition which occurs after injury, and is characterized by a severe, constant, burning pain in the region supplied by one or more of the major nerves to an extremity. The nerves most frequently involved are the median of the upper and the sciatic of the lower extremity. The extremity thus involved usually presents evidence of trophic changes. There is invariably cyanosis of the hand or the foot, and the part is moist and clammy. Any external stimulus, although trifling in itself, usually exaggerates the pain. Causalgia is associated more frequently with partial division than with complete interruption of the continuity of a nerve. It is generally considered now that its origin is in some disturbance of the sympathetic nervous system in the diseased limb. Following the teaching of Leriche, peri-arterial sympathectomy has been used more frequently than any other single method for the relief of causalgia,

but the majority of reports on this method of treatment are distinctly unfavourable. The author reports a case of causalgia of the upper extremity treated successively by neurolysis of the brachial plexus, peri-arterial sympathectomy of the brachial artery, and finally resection of the axillary artery, with no relief of pain. Following a cervico-thoracic sympathectomy prompt and lasting relief was obtained.

FRANK A. TURNBULL

Obstetrics and Gynæcology

Pneumococcus Pelvic Infection in Adults. King, J. E., *Am. J. Obst. & Gyn.*, 1935, **29**: 341.

Pneumococcus peritoneal infections in the adult female occur more frequently than published reports would indicate. They have an especial interest for the gynæcologist and obstetrician. They may be divided into four groups: (1) the pelvic abscess, in which the infection, having become walled off early, remains confined to the pelvis; (2) the generalized peritonitis, in which the entire peritoneum becomes the abscess sac; (3) an infection confined to the tube and ovary; (4) puerperal infection following either abortion or labour at term.

The clinical manifestations of the disease in adult females are constant and characteristic. There is often a previous indisposition, with symptoms of an upper respiratory infection. The invasion of the peritoneum is characterized by its sudden onset and crampy character. An important physical sign is the early tenderness and the sensation of fulness in the cul-de-sac. The pneumococcus on a serious surface promptly calls forth a fibrinous exudate, and it is a rapid pus-producer. The surgeon who has seen the characteristic odourless flocculent pus of these cases should be able to make a table diagnosis. This forestalls a futile search for an abdominal focus and enables the surgeon to confine his attention to establishing adequate drainage.

The genital tract is the most frequent path of infection, but a small percentage probably occurs by other means. More careful histological and bacteriological autopsy studies of the pelvic should be made when opportunity presents. The disease in adults should, because of the clinical features peculiar to them, be studied apart from the disease as seen in children.

ROSS MITCHELL

Two Years' Experience with Theelin Treatment of Gonorrhœal Vaginitis. Miller, J. R., *Am. J. Obst. & Gyn.*, 1935, **29**: 553.

Gonorrhœal vaginitis may be cleared up more or less promptly in many cases following the establishment of a female sex hormone reaction. Relapses are frequently due to reinfection from the urethra, and will be found more frequently if long continued follow-up studies are made. Acute recent infections require longer treatment and larger doses than long-standing infections. Apparently the vaginal infection, whether due to a gonococcus or other organism, responds equally well to the treatment. The urethra apparently is uninfluenced by the hormone. The treatment suggested is that the child be cleared as rapidly as possible with daily injections of at least 100 R.U., diminishing the amount as reaction is obtained, but maintaining a vigorous squamous cell reaction until the gonococcus disappears, and thereafter maintaining over a period of two or three months a moderately well-developed reaction, during which time the child may be allowed to go to school subject to weekly observation by smears.

It cannot be said that the treatment is harmless, for it is not known how the ovaries are affected. So far no deleterious effects have been manifest. End-results of 42 cases are: good results, 19; temporary control only (up to the present time, 16; frank failures, either due to insufficiency of dosage or lack of cooperation, 7. Twenty-six cases studied less than six months are not included in this summary.

ROSS MITCHELL

Renal Function in the Toxæmias of Pregnancy. Dieckman, W. J., *Am. J. Obst. & Gyn.*, 1935, **29**: 472.

The averages for the blood non-protein nitrogen and urea nitrogen in toxæmic women are 30.6 and 14.5 mg. per cent, respectively. In the absence of a hypochloræmia or an oliguria a non-protein nitrogen of 40 mg. per cent or more should always suggest renal impairment. The urinary excretion of water is even more markedly decreased than in normal pregnancy. The concentration of urea and NaCl in the urine is still further increased, thus resulting in an average specific gravity of 1.018 before, and 1,020 after, delivery. The mean for the urea concentration factor is slightly less than that given for the non-pregnant individual. It is approximately one-half of the mean for the normal pregnant patient.

The urea clearance test in patients with toxæmia, hypertension, or nephritis, as a rule, is definitely decreased during the latter half of pregnancy. This impairment is caused by the reduction or delay in the elimination of water and the diminished concentration of urea in the urine. A urea clearance after delivery which is persistently 50 per cent of the normal or less indicates renal impairment. Many patients over a period of 3 to 6 months after delivery show considerable increases in the clearance. Therefore, renal functional tests for diagnostic value should be performed weeks, or preferably months, after delivery. The Addis count is considerable value in differentiating the various

types of toxæmia during pregnancy. Careful observations and repeated studies of the blood, urine, and renal function over a period of years in a large number of toxæmic patients are essential for a proper classification. ROSS MITCHELL

Pædiatrics

Some Observations on Rheumatism in Children. Preston, T. W., *Brit. J. of Childr. Dis.*, 1935, **32**: 1.

This is a survey based upon the study of several hundred children who came to the Elizabeth Bullock Putney and Downham Rheumatism Supervisory Centres during the past four years. The author discusses "growing pains" and their relationship to rheumatism and carditis; also the place of tonsillectomy in the same connection.

The statistics given by Dr. Preston show that a large proportion of the children who were referred to the clinic, presumably for various pains and aches, were not rheumatic, or doubtfully so. Many of the pains complained of were actually due to trauma, minor orthopædic conditions, or general debility. The cases fell into the following classes:—

A. Cases with a definite history of acute rheumatism:	
(1) with carditis	95
(2) without carditis	97
B. Cases with a definite history of chorea: (eighteen of these children also had acute rheumatism)	
(1) with carditis	48
(2) without carditis	86
C. Cases of sub-acute or insidious rheumatism:	
(1) with carditis	77
(2) without carditis	120
D. Cases of doubtful rheumatism	259
E. Non-rheumatics	280

The author refers to the contradictory opinions that have been expressed in regard to the relationship of "growing pains" to rheumatism. "Growing pains" are in most cases nothing more, or less, than a local manifestation of rheumatism in the muscles and fasciæ. Occasionally, in such cases, the heart is involved. Some of the so-called "rheumatic" pains in the limbs in children are due to a septic myo-fibrositis analogous to that found in adults. "Growing pains" are uncommon in children known to have had acute rheumatism. The heredity factor must be reckoned with. Tonsillectomy is of value in the case of children with growing pains in whom the tonsils are septic. JOHN NICHOLLS

Therapeutics

Treatment of Bed-Sores with Elastic Adhesive Plaster. Carty, T. J. A., *Brit. M. J.*, 1935, **1**: 105.

The author describes a simple method of treating bed-sores, which he has successfully used in 10 cases, one of which had proved refractory to other methods of treatment for sixteen weeks. The method consists simply in the application, one over the other, of two pieces of elastic adhesive plaster (elastoplast), so that the bed-sore and the surface surrounding it are covered for at least an inch. In the case of bed-sores having a greater diameter than the elastoplast, two strips placed side by side and slightly overlapping, are used. The dressing is left in place as long as it will adhere, usually 12 to 24 hours at first when the discharge is plenteous. It is then removed and another strip reapplied without cleansing the surface of the ulcer. In no case did this treatment cause a rise in the patient's temperature, and the only unpleasant symptom complained of was itching which was never severe enough to necessitate stopping the treatment. Healing occurring with remarkable rapidity, being complete in from 7 to 15 days in all cases. In seven of the cases no nursing care was available.

The reason for the good results, the author believes, is the perfect protection afforded to the capillary loops in the base of the healing ulcer—since they are cushioned from the dressing by the retained discharge, while the dressing, being adherent to the surrounding skin, is not movable on the ulcer surface. It is possible that the retained discharge has considerable proteolytic power, helping to liquefy the necrosed tissue on the base and about the edges of the ulcer. Certainly, the epithelial proliferation was very rapid; whether due to stimulation or opportunity, it is difficult to say. Since none of the cases proved refractory and no bad effects were obtained, this simple method is worthy of further trial.

W. FORD CONNELL

Treatment of Cellulitis, Suppuration and Burns. Robb, J. J., *Brit. M. J.*, 1935, **1**: 466.

Certain principles of treatment are discussed and methods described which the author has used most successfully for some two years. He first of all lays great stress on the desirability of immobilizing as completely as possible any acutely inflamed tissue. Not only should the lesion be splinted, but the dressing used should in itself possess some splinting action. For this purpose, elastic adhesive plaster or visco-paste bandage is advised. In cellulitis of an extremity, for example, the author applies layers of bandage to completely encircle the limb as far up as there is any lymphangitis. He does not see the patient again for 4 to 7 days unless general symptoms develop. Often a cellulitis is found to respond so well to this treatment that the patient may return to work in four days, wearing the bandage. Only if fluctuation is palpated through the bandage is it removed and surgery resorted to. When an abscess has been successfully incised, the author is opposed to drainage,

unless indeed the opening has been made through muscle, which will close immediately. If there is no marked cavity after evacuation of the pus and bleeding has stopped, a visco-paste bandage is again applied. If a pack is necessary, glycerin-soaked gauze is used, and the wound dressed with dry, sterile gauze. On the fifth day the pack is removed and a bandage dressing applied in the usual way. Weekly changing of dressings is sufficient, the lesion being cleansed each time with sterile water or alcohol.

The author has also most successfully applied the above methods to the treatment of burns. The involved part is splinted, and elastic adhesive or visco-paste bandage applied to the burn after cutting away the blisters. Unless the area is very foul, no preliminary cleansing will be necessary, and relief from pain following the application will be great. Air is allowed to circulate freely about the part, and warm air baths utilized if desirable. The first dressing is left in place for two to three weeks in out-patient and three to six weeks in hospital cases. Epithelialization proceeds extremely rapidly. When the dressing is removed only raw areas are redressed. The author has not found the above methods at all costly, because of the greatly reduced number of dressings necessary.

W. FORD CONNELL

Treatment of Simple Inflammation of the Skin (Dermatitis). Haldin-Davis, H., *Brit. M. J.*, 1935, **1**: 289.

Of the hundred or so important dermatoses not more than one dozen are common in general practice. Ninety-five per cent of cases seen will be inflammatory diseases of the skin due to some external irritant or cases of septic infection, as impetigo or furunculosis, or some combination of these conditions.

The great principle of all dermatological treatment is to avoid measures which may increase any inflammation present. Hence in a septic infection, as impetigo, where an antiseptic is called for, it must be used in minimal concentration; the salts of mercury are still the most popular in this condition. Accumulated discharges are best removed with oil, as inflamed skin stands water badly.

In any case of eczema, adequate protection must be afforded the skin — from friction, and contact and also from evaporation of exudate, with hardening and crust formation. Hence, fats are most useful, especially soft paraffin (vaseline). This may be thickened with lanoline or lard, and, if necessary, starch added to soak up discharge. Usually, to such an ointment base a salt of a heavy metal is added, most commonly zinc oxide or carbonate (calamine), or zinc oleate. They add body to the ointment and may have some active soothing effect; very rarely, they may prove irritant and must be omitted.

Since water is harmful, the author deprecates the use of lotions in dermatitis; he condemns even the popular calamine lotion, though recognizing that some cases get well "in spite of it". Sweet oil or liquid paraffin may be used for cleansing the skin. If an affected limb be first coated with vaseline, the patient may safely be able to enjoy a tub bath. For perineal inflammations, sponging after defæcation is necessary, as organic débris is even more harmful than water. Occlusive dressings, as Unna's paste, are recommended in some cases of inflamed limbs.

More chronic cases require some stimulating treatment. With crusting and scaling, 2 per cent salicylic acid is useful, in the ointment. Two per cent liquor picis carbonis is often helpful; crude coal tar, 2 per cent, in a paste, is most efficacious in infantile eczemas. One to 3 per cent silver nitrate solution is recommended for painting cracks and fissures.

The x-ray is often highly helpful in chronic cases. Three half-pastille doses a fortnight apart can do no harm, and are often of inestimable benefit.

W. FORD CONNELL

Oto-Rhino-Laryngology

Precancerous Epitheliomatosis (Bowen's Disease) of the Palate and Fauces. Howarth, W., *J. Laryngol. & Otol.*, 1935, **50**: 28.

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The cases were all treated with satisfactory results by diathermy cauterization.

GUY H. FISK

Chronic Pyogenic Inflammation of the Antrum and other Accessory Sinuses. Tilley, H., *J. Laryngol. & Otol.*, 1935, **50**: 1.

This paper discusses the manifestations of the maxillary sinuses with their pathology. There is a brief review of the anatomy and function of the air sinuses of the skull, the essence of

types of toxæmia during pregnancy. Careful observations and repeated studies of the blood, urine, and renal function over a period of years in a large number of toxæmic patients are essential for a proper classification. ROSS MITCHELL

Pædiatrics

Some Observations on Rheumatism in Children. Preston, T. W., *Brit. J. of Childr. Dis.*, 1935, **32**: 1.

This is a survey based upon the study of several hundred children who came to the Elizabeth Bullock Putney and Downham Rheumatism Supervisory Centres during the past four years. The author discusses "growing pains" and their relationship to rheumatism and carditis; also the place of tonsillectomy in the same connection.

The statistics given by Dr. Preston show that a large proportion of the children who were referred to the clinic, presumably for various pains and aches, were not rheumatic, or doubtfully so. Many of the pains complained of were actually due to trauma, minor orthopædic conditions, or general debility. The cases fell into the following classes:—

A. Cases with a definite history of acute rheumatism:	
(1) with carditis	95
(2) without carditis	97
B. Cases with a definite history of chorea: (eighteen of these children also had acute rheumatism)	
(1) with carditis	48
(2) without carditis	86
C. Cases of sub-acute or insidious rheumatism:	
(1) with carditis	77
(2) without carditis	120
D. Cases of doubtful rheumatism	259
E. Non-rheumatics	280

The author refers to the contradictory opinions that have been expressed in regard to the relationship of "growing pains" to rheumatism. "Growing pains" are in most cases nothing more, or less, than a local manifestation of rheumatism in the muscles and fasciæ. Occasionally, in such cases, the heart is involved. Some of the so-called "rheumatic" pains in the limbs in children are due to a septic myo-fibrositis analogous to that found in adults. "Growing pains" are uncommon in children known to have had acute rheumatism. The heredity factor must be reckoned with. Tonsillectomy is of value in the case of children with growing pains in whom the tonsils are septic. JOHN NICHOLLS

Therapeutics

Treatment of Bed-Sores with Elastic Adhesive Plaster. Carty, T. J. A., *Brit. M. J.*, 1935, **1**: 105.

The author describes a simple method of treating bed-sores, which he has successfully used in 10 cases, one of which had proved refractory to other methods of treatment for sixteen weeks. The method consists simply in the application, one over the other, of two pieces of elastic adhesive plaster (elastoplast), so that the bed-sore and the surface surrounding it are covered for at least an inch. In the case of bed-sores having a greater diameter than the elastoplast, two strips placed side by side and slightly overlapping, are used. The dressing is left in place as long as it will adhere, usually 12 to 24 hours at first when the discharge is plenteous. It is then removed and another strip reapplied without cleansing the surface of the ulcer. In no case did this treatment cause a rise in the patient's temperature, and the only unpleasant symptom complained of was itching which was never severe enough to necessitate stopping the treatment. Healing occurring with remarkable rapidity, being complete in from 7 to 15 days in all cases. In seven of the cases no nursing care was available.

The reason for the good results, the author believes, is the perfect protection afforded to the capillary loops in the base of the healing ulcer—since they are cushioned from the dressing by the retained discharge, while the dressing, being adherent to the surrounding skin, is not movable on the ulcer surface. It is possible that the retained discharge has considerable proteolytic power, helping to liquefy the necrosed tissue on the base and about the edges of the ulcer. Certainly, the epithelial proliferation was very rapid; whether due to stimulation or opportunity, it is difficult to say. Since none of the cases proved refractory and no bad effects were obtained, this simple method is worthy of further trial.

W. FORD CONNELL

Treatment of Cellulitis, Suppuration and Burns. Robb, J. J., *Brit. M. J.*, 1935, **1**: 466.

Certain principles of treatment are discussed and methods described which the author has used most successfully for some two years. He first of all lays great stress on the desirability of immobilizing as completely as possible any acutely inflamed tissue. Not only should the lesion be splinted, but the dressing used should in itself possess some splinting action. For this purpose, elastic adhesive plaster or visco-paste bandage is advised. In cellulitis of an extremity, for example, the author applies layers of bandage to completely encircle the limb as far up as there is any lymphangitis. He does not see the patient again for 4 to 7 days unless general symptoms develop. Often a cellulitis is found to respond so well to this treatment that the patient may return to work in four days, wearing the bandage. Only if fluctuation is palpated through the bandage is it removed and surgery resorted to. When an abscess has been successfully incised, the author is opposed to drainage,

unless indeed the opening has been made through muscle, which will close immediately. If there is no marked cavity after evacuation of the pus and bleeding has stopped, a visco-paste bandage is again applied. If a pack is necessary, glycerin-soaked gauze is used, and the wound dressed with dry, sterile gauze. On the fifth day the pack is removed and a bandage dressing applied in the usual way. Weekly changing of dressings is sufficient, the lesion being cleansed each time with sterile water or alcohol.

The author has also most successfully applied the above methods to the treatment of burns. The involved part is splinted, and elastic adhesive or visco-paste bandage applied to the burn after cutting away the blisters. Unless the area is very foul, no preliminary cleansing will be necessary, and relief from pain following the application will be great. Air is allowed to circulate freely about the part, and warm air baths utilized if desirable. The first dressing is left in place for two to three weeks in out-patient and three to six weeks in hospital cases. Epithelialization proceeds extremely rapidly. When the dressing is removed only raw areas are redressed. The author has not found the above methods at all costly, because of the greatly reduced number of dressings necessary.

W. FORD CONNELL

Treatment of Simple Inflammation of the Skin (Dermatitis). Haldin-Davis, H., *Brit. M. J.*, 1935, **1**: 289.

Of the hundred or so important dermatoses not more than one dozen are common in general practice. Ninety-five per cent of cases seen will be inflammatory diseases of the skin due to some external irritant or cases of septic infection, as impetigo or furunculosis, or some combination of these conditions.

The great principle of all dermatological treatment is to avoid measures which may increase any inflammation present. Hence in a septic infection, as impetigo, where an antiseptic is called for, it must be used in minimal concentration; the salts of mercury are still the most popular in this condition. Accumulated discharges are best removed with oil, as inflamed skin stands water badly.

In any case of eczema, adequate protection must be afforded the skin — from friction, and contact and also from evaporation of exudate, with hardening and crust formation. Hence, fats are most useful, especially soft paraffin (vaseline). This may be thickened with lanoline or lard, and, if necessary, starch added to soak up discharge. Usually, to such an ointment base a salt of a heavy metal is added, most commonly zinc oxide or carbonate (calamine), or zinc oleate. They add body to the ointment and may have some active soothing effect; very rarely, they may prove irritant and must be omitted.

Since water is harmful, the author deprecates the use of lotions in dermatitis; he condemns even the popular calamine lotion, though recognizing that some cases get well "in spite of it". Sweet oil or liquid paraffin may be used for cleansing the skin. If an affected limb be first coated with vaseline, the patient may safely be able to enjoy a tub bath. For perineal inflammations, sponging after defæcation is necessary, as organic débris is even more harmful than water. Occlusive dressings, as Unna's paste, are recommended in some cases of inflamed limbs.

More chronic cases require some stimulating treatment. With crusting and scaling, 2 per cent salicylic acid is useful, in the ointment. Two per cent liquor picis carbonis is often helpful; crude coal tar, 2 per cent, in a paste, is most efficacious in infantile eczemas. One to 3 per cent silver nitrate solution is recommended for painting cracks and fissures.

The x-ray is often highly helpful in chronic cases. Three half-pastille doses a fortnight apart can do no harm, and are often of inestimable benefit.

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GUY H. FISK

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This paper discusses the manifestations of the maxillary sinuses with their pathology. There is a brief review of the anatomy and function of the air sinuses of the skull, the essence of

which is that their topographical relations are extremely variable and hence the numerous clinical symptoms presented by a sinusitis. As the mucous membrane of the accessory sinuses is an important defensive mechanism it is important that as little as possible be removed during surgical operations. There are four principle types of antral infection; the œdematous, the infiltrative, the fibrotic and the cystic. A fifth type is added to these by the author. This is the form in which the infection has passed through the periosteum and invaded the bone. This type forms the basis for the cases of osteomyelitis. Many cases which do not heal completely after operation and in which symptoms recur will show involvement of residual bone. Instances are quoted in proof of this. In treatment, therefore, not only should the infected pyogenic membrane be removed but also all infected osseous tissue. Recurrence of symptoms after operation is also an indication for the operative removal of infected bone.

GUY H. FISK

The Diagnosis and Treatment of Abscess of the Brain. Cairns, H. and Donald, C., *J. Laryngol. & Otol.*, 1935, **50**: 73.

This article summarizes the experiences of the authors in cases of brain abscess with various operations. An abscess of the brain may be a thick-walled chronic abscess or an acute one, later becoming chronic. Good results follow drainage both by the closed method and by the open method, the latter being performed either through a limited opening or an osteoplastic flap. Whichever form of operative treatment is followed the after treatment is the same. The fundamental principles are that the head of the patient is placed so as to obtain dependent drainage, and that the dressing is left in place as long as possible without changing it.

The authors believe that most diagnostic difficulties would be eliminated by a careful neurological examination. Here the determination of the visual fields is the most important part. In all of these abscesses it is necessary to try and form some opinion as to the time they have been present and the stage they are at in order to operate on them successfully.

GUY H. FISK

Anæsthesia

Spinal Anæsthesia in the Treatment of Megacolon and Obstinate Constipation. Stabins, S. J., Morton, J. J. and Scott, W. J. M., *Am. J. Surg.*, 1935, **27**: 107.

The treatment of idiopathic megacolon (Hirschsprung's disease) prior to 1927 was varied and for the most part unsatisfactory. The conservative method of dieting and enemas was far from encouraging, and the earlier radical procedures of surgical intervention had been attended with rather high mortality. The latter ranged from colostomy, partial colectomy, to total extirpation of the colon. More recently lumbar sympathectomy has been employed with varying degrees of success. It was as a result of using spinal anæsthesia as a pre-operative test to determine whether sympathectomy would be of benefit or not, that its efficacy was discovered. The spinal anæsthesia paralyzes temporarily the lumbar sympathetic ganglia whose excess action is responsible for the inhibition of peristalsis and dilatation of the colon. (The spinal anæsthesia must be high enough to block off the pre-ganglionic fibres to the inferior mesenteric ganglion emerging from the spinal cord by the first, second and third anterior lumbar nerve roots, *i.e.*, it must be well above the level of the first lumbar spinal nerves [abstractor's note]).

The authors report 3 cases of idiopathic megacolon and 2 cases of obstinate constipation in children treated successfully by spinal anæsthesia. In one case in particular, the barium enema, given previously and followed by spinal anæsthesia, was expelled almost immediately, and five days later the child began to have normal daily movements. All of the other cases showed definite improvement from the spinal anæsthesia alone and no recourse was had to lumbar sympathectomy. The authors conclude that spinal anæsthesia has a definite place in those cases of megacolon in which sympathetic activity is the predominating factor, and that marked improvement of the motor function of the bowel is the result, in some cases even continuing to the point of complete relief of symptoms. The definite value of spinal anæsthesia as a therapeutic measure has been established. The treatment may have to be repeated in some cases, but such has not been found necessary in the cases reported.

ARTHUR WILKINSON

Radiology and Physiotherapy

The Radiologist as a Physician. *Radiology*, 1935, **24**: 116.

Fault is found with the relationship of the physician and the radiologist, which falls midway between the ideal of medical consultation and the more remote pathological report. The idea of laboratory diagnosis in x-ray work is frowned upon. In the early days of x-ray diagnosis the man dominated the machine because he was a physician first. Today the machine will dominate the man if he fails to remain a physician in all things. The radiologist should take an all-round view of his patient as to history and examination. The value of the personally taken history cannot be over-estimated if a radiologist's opinion is to be

esteemed by his fellow consultants. The radiologist should be as highly qualified as his fellow specialists in medicine, plus his qualifications in his own specialty. He should have completed three years' house appointments as a young physician in large general services, and, ideally, he should have a year or two of general practice with special emphasis on pathology and biochemistry. Perhaps too much emphasis has been laid on the amount of physics necessary to qualify in radiology.

There are three sorts of specialists, (1) those of a special method; (2) regional specialists; and (3) those dealing with diseases as such. Radiologists are concerned with the first and third, for thus they embrace the second. It is advisable, if possible, that the radiologist should equip himself for the higher qualifications in medicine, and it is essential that there should be recognition of the qualified radiologist by a higher diploma or Board of Radiology.

A. S. KIRKLAND

Roentgen Treatment of Carbuncles. Firor, W. B., *Am. J. Roentgenol.*, 1935, **33**: 71.

The value of roentgen therapy in inflammatory disease of soft tissues is not sufficiently appreciated, and the excellent results of such treatment for carbuncles should be more fully known. From 1906 onwards a constantly increasing number of cases successfully treated is recorded. Treatment should be given as early as possible, and is followed in a few hours by relief from pain. The lesion so treated tends to liquefy and then discharge, either spontaneously or with the aid of a small incision. The dosage recommended varies from small unfiltered applications to larger doses of 300 to 400 R. The total dose should vary in penetration, filtration, with the location, duration and extent of the carbuncle.

A. S. KIRKLAND

Pathology and Experimental Medicine

The Influence of the Cerebral Cortex on Gastro-intestinal Movement. Watts, J. W., *J. Am. M. Ass.*, 1935, **104**: 355.

The recent observations of such workers as Cushing, Beattie, etc., have aroused much interest in the hypothalamic influences on gastro-intestinal function. The present writer made a careful study of the gastro-intestinal tracts of 80 monkeys as a control study in preparation for later experimental effects of hypothalamic lesions. His initial observation is interesting. In 80 monkeys examined but 3 showed intussusception. All of these 3 had been subjected to ablation of the pre-motor areas, while in 300 preceding autopsies no case of intussusception had been reported. Although suggestive of some cortical influence this was not regarded as conclusive. Experimental reports of numerous investigators show that stimulation of various areas of the brain produced excitation of gastro-intestinal peristalsis, while section posterior to the thalami produced inhibition (possibly hypothalamic).

The author's experimental findings showed a definite increase in peristalsis following premotor stimulation, frequently producing intussusception. Bilateral vagotomy destroyed these responses. The results of sympathectomy were not studied.

In comment on this work the author refers to cases described in which gastro-intestinal symptoms served to abort, or be substituted for, focal epileptic seizures. Correlating this work with that of Penfield and Gage, who produced abdominal symptoms by cortical stimulation, it may be said that cortical autonomic representation of the gastro-intestinal tract has been demonstrated in both motor and sensory components. The author expresses the belief that the epigastric auræ are not referred sensations but the result of vigorous abnormal gastro-intestinal movements.

G. N. PATERSON-SMYTH

Family Tree Showing Hereditary Undescended Right Testicle, and Associated Deformities. Wiles, P., *Proc. Roy. Soc. Med.*, 1934, **28**: 157.

An undescended right testicle had existed in two brothers, their father, and his father. In addition to the two affected males in the third generation there had been three normal brothers, and a sister with deformed fingers on the right hand. The affected father had had one normal brother and three normal sisters, but one of the latter had had a son who had but two phalanges to all fingers, partial webbing of the fingers, and an absent right foot. Undescended testes are usually associated with sterility, so that the hereditary nature of the defect is necessarily obscured, but in this family in which but one testis was affected, the hereditary nature of the defect is obvious.

MADGE THURLOW MACKLIN

Researches on Twins with Diabetes Mellitus. Pannhorst, R., *Deutsche. med. Wchnschr.*, 1934, **60**: 1950.

The importance of studying disease processes in twins, both of the identical and fraternal types, in the elucidation of the rôle played by inheritance in disease has been recognized for some time. If one identical twin develops a disease which is hereditary, it is expected that the other twin will also develop the same disease, although a period of some years may elapse before the onset of the disease in the second twin. If one fraternal twin develops an

hereditary disease, the other twin may or may not develop it. Pannhorst publishes a study of five pairs of twins with diabetes mellitus. The first pair were identical or uniovular female twins. One had syphilis, also diabetes for two years. The other was still normal, with no glycosuria and a normal blood sugar curve. The second pair were bi-ovular male twins; with one normal, one affected with diabetes for one year. The normal twin had a normal blood sugar curve and no glycosuria. The third pair were bi-ovular female twins, again one normal, the other affected with diabetes for one year. The fourth pair were bi-ovular males, aged 40, both affected. One had been ill since he was 29, the other since he was 37. The fifth pair were bi-ovular or fraternal twins, one male and one female. The brother was obviously ill with a resting blood sugar value of 348 mg. per cent. This rose after the administration of glucose to 474 mg., and fell to 431 after two and a half hours. He had been ill for seven years. The sister was well, and showed no glycosuria, but her resting blood sugar was 115 mg. per cent, and rose to 323 mg. after taking sugar. This value had fallen to only 225 after the lapse of 2½ hours. She was obviously a latent case of diabetes. Investigation of the other twin, and of other members of the family besides the twin is of value in detecting latent cases of diabetes mellitus, once one member has shown it.

MADGE THURLOW MACKLIN

Malignant Nephro-Sclerosis (Malignant Hypertension). MacMahon, H. E. and Pratt, J. H., *Am. J. M. Sc.*, 1935, **189**: 221.

The authors have studied malignant nephrosclerosis from both clinical and pathological standpoints. They believe that it is a separate and distinct disease, though it may occur as a terminal complication of the benign type of nephrosclerosis. The authors believe that the earliest lesion in the disease is damage to the endothelium of vessels, which may be slight or severe. If slight, fluid elements of the blood alone pass through into the wall of the vessel; if the damage is great cellular elements enter also. The reaction in the vessel wall varies with the irritant, and therefore, varies from a simple degenerative process (in which case the disease progresses slowly) to actual inflammatory changes in the intima, with necrosis and hæmorrhage, in which case the course is rapid and the prognosis grave. The simple degenerative cases are classed as benign nephrosclerosis, whereas the latter only warrant the term malignant nephrosclerosis.

The actual cause of the disease has not been discovered. The clinical histories of 60 patients who died of the malignant type revealed no constant relationship to past disease, to race, to sex, or to occupation. The authors believe that the constitutional factor plays a very important rôle. In the very early stages, when only cardiovascular signs and symptoms are present, it may be impossible to predict whether the case will be one of benign or malignant nephrosclerosis. As the disease progresses, the renal component becomes more and more conspicuous, and in the late stages it may be impossible to differentiate the disease from chronic glomerulonephritis.

E. S. MILLS

Obituaries

Dr. T. Glendenning Hamilton, pioneer in the West for more than fifty years, and an international figure in psychic research, died of angina pectoris in the Winnipeg General Hospital on April 7th, aged sixty-one. Born in Agincourt, Ont., Glen Hamilton came with his parents in 1883 to a homestead on what is now the site of Saskatoon. One of his early memories was the hospitality shown by his father to convalescent soldiers of the '85 rebellion on the Saskatchewan. In 1891 his widowed mother brought her family to Winnipeg to secure better education. The young man entered the Winnipeg Collegiate and later Manitoba Medical College, graduating in 1903. After an intern year in the Winnipeg General Hospital he began practice in Elmwood, and continued to practise in that suburb until his death.

Doctor Hamilton was a Lecturer in Clinical Surgery in the Medical Faculty of the University of Manitoba, a member of the Surgical Staff of the Winnipeg General Hospital, Secretary and then President of the Manitoba Medical Association (1921-22), member of the Executive Committee of the Canadian Medical Association from 1922 to 1931, and Chairman of the Committee on Constitution and By-Laws.

From 1915 to 1920 he was a member of the Manitoba Legislative Assembly and was active in the passage of Mothers' Allowance legislation. For several years he represented Elmwood on the Winnipeg Public School Board, and served as Chairman of the Board, 1912 and 1913. He was the first chairman of the Winnipeg Playgrounds Commission. For twenty-eight years he was an elder of King Memorial Church.

Considerable as these achievements were, it was his investigation of psychic phenomena that made him so widely known. His researches, begun in 1918 and continued up to his death, brought him into contact with notable world figures such as Sir Arthur Conan Doyle (who attended a séance in Dr. Hamilton's home), Sir Oliver Lodge, and Dr. and Mrs. Crandon (Marjory), of Boston. In 1930, when the British Medical Association met in Winnipeg, he addressed a large meeting of the delegates. Two years later he lectured on psychic research at Toronto, at Carnegie Hall in New York, and at Washington. His experiments in psychic energy, conceived on strictly scientific lines, and his conclusions from those experiments were being put into a book which was not completed before his untimely death.

Dr. Hamilton is survived by his widow, who aided him greatly in his experiments; two sons, Dr. Glen F., and James D. Hamilton; and a daughter, Mrs. James R. Bach, of London.

The esteem and affection felt for the beloved family physician were shown in the gathering which thronged King Memorial Church at his funeral.

AN APPRECIATION

What shall I say of this man, this elder, this excellent physician, this soul honest and unaffected, and friendly, enduring and courageous? His was no easy

fight. He had faced derision and ridicule and calumny and, smiling, turned their thrusts upon his sword of truth. The first address I heard him give on his psychic experiences was some eight years or so ago before the Winnipeg Medical Society, at a time when he had already been investigating these phenomena for several years. The crowd before the meeting were derisive. "Come on Glen! Bring on your ghosts!" He smiled at them and, unruffled, spoke. He mentioned no ghost, nor spirit, nor personality, but he talked about a table, a table that moved at request, that rushed across the room, that leapt in the air, that defied the efforts of strong men to hold it. And as he talked he showed photographs of these actions. And because we knew Glen we knew these things were true. He offered neither explanation nor theory, simply facts; we might interpret them as we would. That night he had many converts.

A month ago I sat one evening in the Hamilton's living-room, waiting as one by one the other sitters gathered for a séance. The fire crackled. All was pleasant and friendly. It was almost the hour to go up before the Doctor came in from the hospital, yet to have his supper. But there was no haste. Jests and smiles of easy affection greeted him "Late again T.G." "What will your disembodied friends say for keeping them waiting?" He laughed them off, and sat down to tea and toast and jam. Unhurriedly he ate, jesting with these friends with whom he shared his search for truth. And then at last we went up. It was the fourth evening within the week he had spent studying psychic phenomena; two hours a night of hard work under strain.

This is not the place to discuss these investigations in themselves, though it will be for these that he will be known to history. From table rappings he passed to observations on the apparent animation of dead things, to trance speech and writing, to the photography of masses extruded from the bodies of mediums, masses at first amorphous, later moulded in the likeness of the known dead. These phenomena were all genuine. The yellow fog of doubt that hangs about all mediumistic doings was dispelled by the character of the man. Day after day, week after week, year after year, when the ordinary day's work was done, he observed, recorded, analyzed. I often wondered how he had the patient stubbornness to persist. There lived a quality of mind rare in any age, even in the man who is a professing scientist; an endurance and an eagerness to carry this, his heart's work, on top of a great load of professional and social duties, showing forth a man of powerful character. Now he is gone from this world of solid flesh. To but a few that strong and steady personality shall again become phenomenal; for the rest of us his spirit alone remains.

BRUCE CHOWN

Dr. Henry Merrill Barrett, of Mount Elgin, Ont., died at Mount Elgin, on March 19, 1935, at the age of 45 years. He had been confined to his bed for six weeks suffering from cardiac insufficiency. His disability dated back to his services with the medical corps during the war. Enlisting in 1915 with the R.A.M.C. at London, he served overseas until May, 1919, winning the Military Cross. For the past 14 years he had practised in Mount Elgin, where he won the esteem of his medical confrères and the whole countryside. He was secretary of the Mount Elgin library board and a Past-master of Dereham Lodge, A.F. and A.M. He was an ardent lover of the gun and the northern habitat of the deer.

Besides his mother, Mrs. Robert Barrett of Dereham, he is survived by his widow, formerly Miss Jessie Brooks of Beachville and four children, Robert, William, Mary and Barbara.

Dr. William McEvery Brown, of Neustadt, Ont., died on April 14, 1935. He was a graduate of Trinity University (1884), and L.R.C.P. Lond. (1884).

Dr. Edward Manning Casey, of Montreal, died on March 29, 1935, in his thirty-sixth year. Born in Milltown, N.B., Dr. Casey received his early education there, and later obtained his B.A. at St. François Xavier College, Antigonish, N.S. He then came to Montreal, where he obtained his medical degree at McGill University. While a student at McGill he played a prominent part in student politics, and was for a term president of the Students' Council. After graduating, he spent several years in the Montreal General Hospital, till 1931, when he established his own practice.

He was well-known in military circles, being a captain in the C.A.M.C. attached to the 17th, Duke of York, Royal Canadian Hussars.

He is survived by his wife, the former Miss Ino Chisholm, of Antigonish, N.S., and four young children.

Dr. Adalbert Britton Deynard, of Owen Sound, Ont., and New York, died on March 21, 1935, in his eighty-seventh year. He was born in Prince Edward County eighty-six years ago, the youngest child in a family of fourteen. His ancestors were among the distinguished pioneer families of Ontario. He received his early education in the public school of Atholl Township and Peterborough High School. He commenced the study of medicine in Philadelphia, continuing his training in Ontario and graduating in Medicine in 1876 from Queen's University, Kingston. He commenced practice in Chicago, later going to England, where he spent two years in hospital work in London. Continuing his post-graduate study he visited Paris, Rome and Vienna, spending a year in the last great hospital centre.

Returning to Canada Dr. Deynard practised from 1882 to 1888 at Williamsford, Chatsworth and finally at Owen Sound. In 1886 he went to New York City, where he identified himself with research and pursued his work as an eye, ear and throat specialist. He was subsequently appointed to the staff of three hospitals, the Manhattan Eye and Ear Hospital, the Bellevue Hospital and the Vanderbilt Clinic. He also taught medicine and lectured on the eye in the Post-Graduate School of New York. He spent many years in New York, interspersed with extensive travel.

In his young manhood Dr. Deynard attended the Military College at Kingston and when the Great War broke out he enlisted as a surgeon in the British Mercantile Marine. For his courageous service he was awarded two medals by His Majesty King George.

In his latter years Dr. Deynard divided his time principally between New York, Washington and Owen Sound, where he made his home with his nephew, Dr. A. L. Deynard. He is survived also by one brother, Mr. Leslie Deynard, of Cherry Valley, Prince Edward County.

Dr. Joseph Alfred Desrosiers died on March 8th at the age of 48. He was born at Ste. Luce, and graduated in medicine at Laval University, in 1915, *summa cum laude*, gaining the medal of the Lieutenant-Governor for the year 1914-15. After a short period of practice in Montreal he established himself at Bic, P.Q.

Dr. Grosvener Ladley Travers Hayes, died in the Royal Victoria Hospital, Montreal, on April 2, 1935. He was sixty-four years of age.

A native of Dublin, Ireland, Dr. Hayes was the son of the late Dr. Thomas Edward Hayes, and Frances Travers Adams. He came to America and settled at Barre, Vermont, where he married. He graduated from Bishop's College and in 1912 received his medical degree at McGill. He was attached many years ago to the Western division of the Montreal General Hospital.

He is survived by his widow, formerly Laura Suitor, of Barre, Vt., his other relatives being Lady Johnson, Montreal, and Mrs. William Williams, of Freemantle, Western Australia.

Dr. Charles Lemaire died at Ste. Clotilde, P.Q., on March 27th at the age of 71. A native of St. Bonaventure, he had studied at the Seminary of Nicolet and graduated in medicine from Victoria University Medical School in 1890. He practised his profession at Ste. Clotilde for 46 years.

Dr. Frederick Charles Marlow, of Toronto, a well-known surgeon, died suddenly on April 25, 1935, aged forty. He was a graduate of the University of Toronto (1915). He was Police Surgeon for the eastern part of Toronto. He is survived by his wife and three young children.

Dr. Dugald McKenzie, for nearly twenty-five years a physician in Toronto, died recently at his residence, in his seventy-fourth year. Before coming to Toronto, Dr. McKenzie practised at Newtonville, near Port Hope. For the past ten years he had been retired. He was a graduate of the University of Toronto (1886).

Dr. J. A. H. Mackay, of Beauport, P.Q., died on March 17th, after a long illness at the Hôpital de l'Enfant Jésus, at the age of 34. He studied at the Seminary of Quebec and graduated in medicine at Laval University in 1927, after which he settled in Beauport and soon established a large practice. He leaves a wife and four children.

Dr. Auguste Martin, of Montreal, died on April 1, 1935, after a prolonged illness. He was born at St. Simon, Rimouski County, 58 years ago, and was educated at the Jacques Cartier Normal School, Montreal. He took his medical degree at Laval University of Montreal. He practised at Campbellton, N.B., and was instrumental in bringing about the construction of the new Hôtel-Dieu Hospital there, serving for five years on the staff. Ten years ago he was taken ill and had to receive treatment in Montreal, so he moved his family up to the city and had resided there ever since. He is survived by his widow, formerly Ann Leclerc, of Beauharnois, three sons, Paul, Harry and John, and two daughters, Aline and Jean.

Dr. L. Clovis Mayrand died on March 27th at the age of 77. He was born at Deschambault, P.Q. After graduating in medicine at Laval University in 1880, he practised for his entire life in his native parish where he built up a fine reputation for kindness and skill.

Dr. L. N. Turgeon, of St. Prime, P.Q., died at the Hôtel-Dieu, St-Michel de Roberval, in the latter part of February of this year, at the age of 35. He was well known and highly esteemed by his fellow citizens. He graduated in medicine from Laval University in 1922.

Reginald Arthur Yeld, M.A., M.D.(Cantab.), of Edgewood, Arrow Lakes, British Columbia, died after an illness lasting less than a week, on April 3, 1935, at the age of 62. He had been resident in Edgewood over twenty years and had a large and difficult district to cover. A few hours earlier in the day before he was taken ill he had visited a patient eight miles from his home, who was suffering from pneumonia, and it is thought that on this trip he contracted a chill. Though the severe winter was over, the roads were frozen and there was a very cold wind from the north. This last visit, when he himself was feeling somewhat run down, was characteristic of Dr. Yeld. He never spared himself in his duty; often had to go twenty miles to see a patient in severe weather; and besides, much of his work was of a charitable nature.

Doctor Yeld was the son of Edward Yeld, I.S.O., an assistant secretary in the General Post Office, London, England. He was a graduate of the Cambridge University Medical School; had been Ophthalmic House Surgeon at St. Bartholomew's Hospital; practised in England for some years before coming to British Columbia, and during that time he was secretary of the Hampstead Branch of the British Medical Association. Upon retiring from that post in 1908 he was the recipient of a handsome presentation by the members of the Branch. He became a Licentiate of the British Columbia College of Physicians and Surgeons, at Victoria, B.C., in May, 1914.

For many years Doctor Yeld had been specializing in eye work, particularly refraction, and had become quite a recognized authority on the subject in his district. He contributed articles dealing with refraction and accommodation to various medical journals. In 1932 he published privately a thesis on "Accommodation in the Human Eye", at which he had been working for years, and in which he collected and reviewed dispassionately the views of all researchers on the subject.

Dr. Yeld will long be remembered by a host of friends and patients throughout an extensive district. He is survived by his widow. J. H. NAYLOR

News Items

Alberta

The first issue of the *Alberta Medical Bulletin* appeared in April, 1935, under the ægis of the Council of the College of Physicians and Surgeons of Alberta, and will be published quarterly. In this *Bulletin* there is a foreword by Dr. W. G. Anderson, President of the Council of College of Physicians and Surgeons of Alberta, in which he states that "we are making this venture, hoping that by presenting information about movements affecting the profession or problems confronting them, in a more preservable form, it may become a forum of great value and interest to all." Judging by this commendable first publication, there is a great need for such a systematized compilation of information for the profession in this province. This issue also contains the address of the Past-President of the Council, Dr. R. B. Francis, of Calgary. Dr. W. G. Anderson, of Wardlow, has contributed an article on "At the Crossroads". Dr. J. S. McEachern of Calgary, one on "Medical Organization in Canada", and Dr. D. S. Macnab, of Calgary, one on "The re-organization of the Alberta Medical Association". Considerable space is devoted to Medical Society news from a number of centres in the province.

MATERNAL DEATHS IN ALBERTA

Year	1931	1932	1933	1934
Total number of births .	17,033	16,936	16,225	15,726
Total number of deaths .	77	59	66	78
From septicæmia	25	24	17	32
From eclampsia	10	10	8	7
From embolism	4	3	2	5
From hæmorrhage	10	9	10	10
From heart conditions ..	—	4	5	3
From other conditions ..	28	9	24	21
Number at full term	33	43	—	—
Number of abortions ..	10	15	18	17
Number of miscarriages .	—	—	—	—
Number of Cæsarean sections	8	1	6	2
Number of instrumental.	—	12	4	—
Number of normal deliveries	17	—	11	—
Number who received pre-natal care	27	—	14	4
Number with no pre-natal care	50	—	40	74

THE TREATMENT OF MENSTRUAL DISORDERS WITH EMMENIN AND A.P.L.

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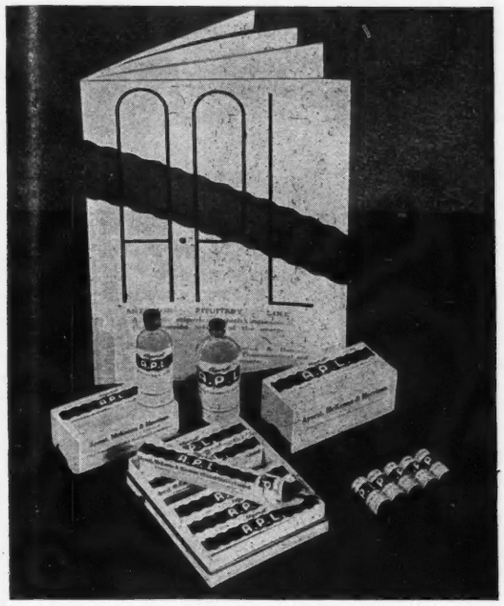

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The most striking application for the use of the gonadotropic hormone — A.P.L. — is in the treatment of menorrhagia and metrorrhagia. It is for subcutaneous or intramuscular administration only and should not be administered until the possibility of infection, fibroid, polyp, or carcinoma is first excluded.

The orally-active oestrogenic hormone of the placenta

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In a few instances during the depression, physicians have made contracts with their patients whereby they would render the necessary medical and surgical services to the man and his family for a year for $25.00, payable in advance. There was to be a mileage charge for country visits. Now it appears that physicians are being pressed to accept contracts from patients of their neighbouring practitioners, and where this has been done friction has arisen. Patients anticipating a needed operation, probably having consulted their own physician or a city man, will ask for the contract from someone where that type of practice has been introduced, all to avoid paying the regular fee for the proposed operation.

G. E. LEARMONTH

British Columbia

Hon. G. M. Weir, Provincial Secretary and Minister of Education, left for Ottawa on April 19th to represent British Columbia at the conference called by Hon. D. M. Sutherland, Minister of Pensions and National Health. Before leaving he made some important announcements of changes to be effected in the province, arising out of legislation enacted at the recent session of provincial parliament. Aged patients will be removed from the mental hospital at Essondale and placed in a separate institution. They will thus no longer be classed as insane, and will be eligible for old age pensions, which will offset their cost of maintenance, and make available a larger number of beds in Essondale.

The growing feeling that British Columbia is at undue expense for the care of indigent sick coming from other provinces was expressed by Dr. Weir at the opening meeting of the conference above referred to. He stated that derelicts, unfit and sick, whose care was properly the responsibility of other provinces were costing the people of British Columbia $700,000 annually. He also stated as his belief that the Indian population of British Columbia provided a reservoir for tuberculosis, and that the white residents were being infected from this source, one means of transmission being the door-to-door sale of articles of Indian handicraft.

Dr. H. M. Cassidy, Director of Social Welfare for British Columbia, addressed the eighth annual meeting of the Family Welfare Bureau of Greater Vancouver on April 29th, on the subject of health insurance. He outlined the plan which has been drafted during the last session of the provincial legislature, and expressed the belief that health insurance would be a matter for individual provinces to deal with, rather than one for federal legislation.

A 54-page booklet embodying the plan of health insurance for British Columbia in full detail has been prepared by the provincial government and distributed to the public, every medical practitioner in the province receiving one. It is requested that it be studied carefully and that views on this proposed legislation be sent in. Among many features it is thought worthy of special note that all employers of prospective beneficiaries will be required to contribute up to a maximum of 2 per cent of the payroll for such employees, and the employee will contribute up to a maximum of 3 per cent of his wages.

On April 29, 1935, Dr. and Mrs. F. T. Underhill, of Vancouver, celebrated their fiftieth wedding anniversary. They were married in Norwich, England, in 1885, coming to Canada in 1894. Two years later Dr. Underhill opened practice in Vancouver, and in 1904 he was appointed medical health officer for Vancouver, which appointment he held for 26 years, until his retirement in 1930. Dr. and Mrs. Underhill lost two sons who were killed on active service in the Great War, but at the family reunion which was held in honour of their golden wedding they were surrounded by their five married daughters and five married sons, with their respective families, which included twenty-five grandchildren.

D. E. H. CLEVELAND

New Brunswick

Hon. Dr. H. I. Taylor, Provincial Minister of Health, is making satisfactory progress, recovering from a severe attack of influenza and bronchitis.

In connection with the King's Silver Jubilee Cancer Fund the lead has been taken in the province by the Lieutenant-Governor, Hon. Dr. Murray MacLaren, who has been indefatigable in his efforts to maintain enthusiasm. The press of the province has given wide publicity to the project and medical speakers have appeared on theatre stages and on the local broadcasting programs to provide the necessary information to the public. A canvass of the province was carried out by the I.O.D.E. under the patronage of the Lieutenant-Governor, under the general title of Cancer Fund Dime Day in which many small contributions swelled the total collection from the province.

Dr. W. E. Rowley, Saint John, who has been ill for a long time is now convalescing in the southern United States.

The public health of the province has been fairly satisfactory with the exception of a rather widespread minor epidemic of measles. Associated with this epidemic there has been a large percentage of cases with middle ear disease.

A. S. KIRKLAND

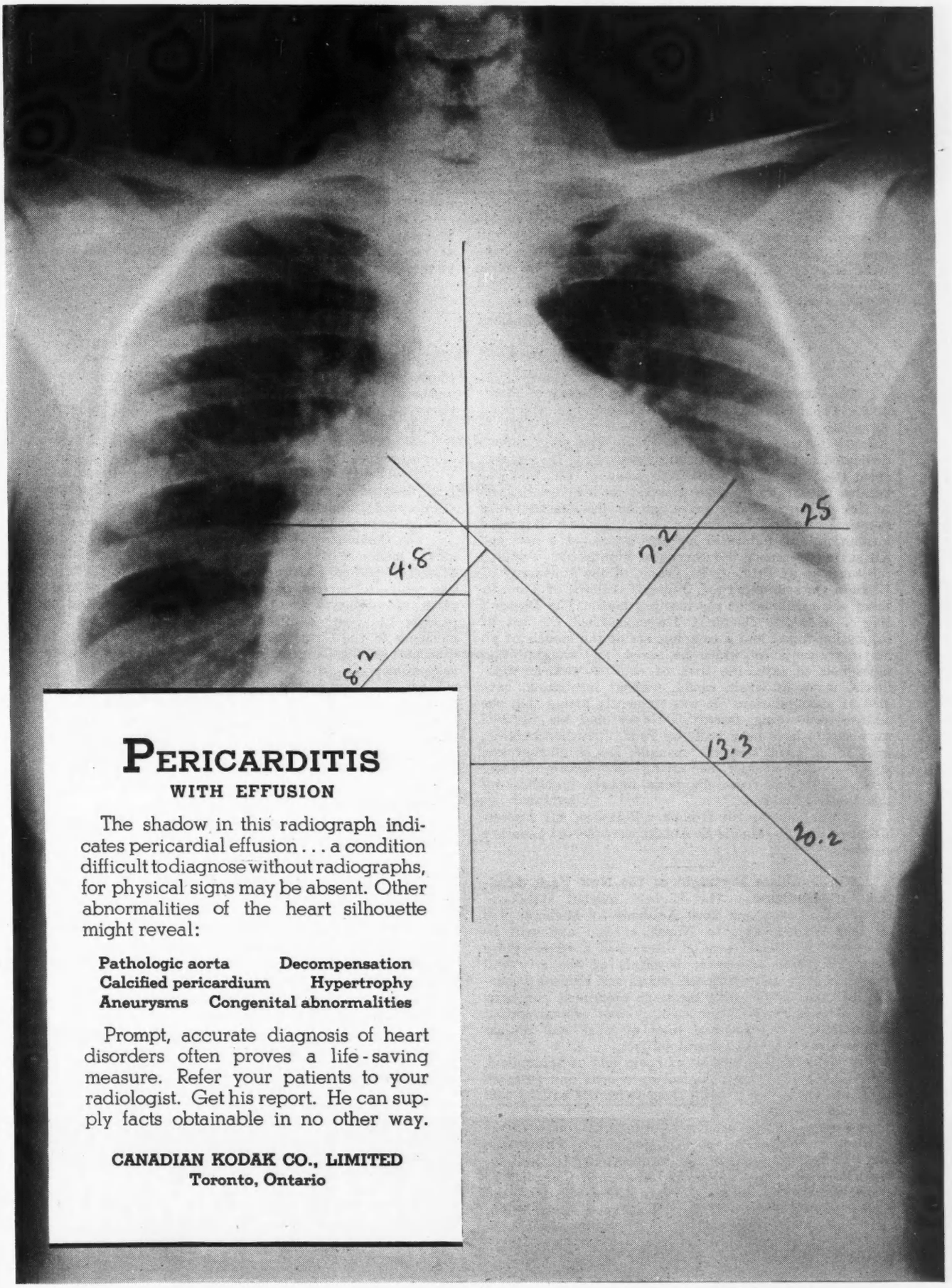
Nova Scotia

Hon. Dr. F. R. Davis, Minister of Health, gave an account of the progress made in combating the ravages of tuberculosis when the House considered the estimates for the Department of Health for the next year. He stated that during the past thirty years the number of cases had been reduced to half and that the death rate had dropped from 1,000 to 478. In 1904 there were 5,000 cases of tuberculosis; at present there are 2,500. He also pointed out that the Department of Health could not be expected to take these 2,500 cases into institutions but that many could be cured with proper treatment at home. Although the work done at present was mainly curative preventive measures were not neglected, and it was very necessary to make grants to hospitals for curative treatment.

Dr. Davis attended the meeting of the provincial Ministers of Health recently held at Ottawa. Among the topics discussed was a scheme of health insurance. This subject, it is said, will be fully investigated by a committee to be appointed by the Federal Department of Health. It is of interest to note that the local government propose to erect a modern building to house all its different departments and the Department of Health will move into its new quarters on the completion of this building.

Dr. W. B. Moore, formerly physician with the Dominion Atlantic Railway, recently returned to Halifax after ten years' absence, during which time he has travelled extensively.

N. B. DREYER



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Ontario

Dr. W. J. Bell, Deputy Minister of Health, has announced that the Ontario Department of Health has purchased three and one-half grams of Canadian-mined radium for use in the Ontario Cancer Clinics. This, added to the one and one-half grams purchased three years ago, will make a total quantity of 5 grams, four and one-half of which were mined in Canada.

The governing body of the Kitchener-Waterloo Hospital has announced a building program which will cost $65,000. The new structure will be built to the west side of the present building, and will be three storeys in height, with basement accommodation. The Shriners will be responsible for the children's ward.

J. H. ELLIOTT

United States

The American Association of the History of Medicine.—The Eleventh Annual Meeting of the American Association of the History of Medicine was held in Atlantic City, N.J., on May 6, 1935. The program was dedicated to the memory of Dr. Joseph P. O'Dwyer, who spent the years of his youth near London, Ont., and who became one of the world's greatest medical benefactors to sick children. Fifty years ago he demonstrated to a skeptical medical profession an improved laryngeal intubation, and published his first article on a new and life-saving treatment for laryngeal diphtheria. Through the courtesy of Prof. J. W. Crane, of the University of Western Ontario and Prof. Jabez H. Elliott, of Toronto, there was exhibited at the meeting both "The Doctor's Bag", in which Doctor O'Dwyer carried the set of intubation tubes, and a complete set of the models of all his instruments by which he saved, and taught other physicians to save, the lives of children sick of diphtheria, many of whom would, without intubation, have died of strangulation. It was eminently fitting that the address concerning Doctor O'Dwyer and his inspired work should have been made by Prof. Chevalier Jackson, who, following O'Dwyer's example, has originated and popularized two other life-saving and health-restoring methods by direct visual diagnosis, namely, bronchoscopy and œsophagoscopy.

At this meeting Sir Humphry Rolleston, Sir Andrew Macphail and Dr. Maude E. Abbott were elected honorary members.

1935 Graduate Fortnight of the New York Academy of Medicine. — The Eighth Annual Graduate Fortnight of the New York Academy of Medicine will be held October 21st to November 2nd and will be devoted to a consideration of diseases of the respiratory tract. Eighteen important hospitals of the city will present coordinated afternoon clinics and clinical demonstrations. At the evening meetings prominent clinicians from various parts of the country who are recognized authorities in their special lines of work will discuss various aspects of the general subject.

A comprehensive exhibit of books and of anatomical, bacteriological and pathological specimens and research material will be assembled. Demonstrations will be held at regular intervals.

Speakers at the evening meetings will include Drs. J. Burns Amberson, George Blumer, Henry Chickering, Lloyd F. Craver, Alphonse R. Dochez, Leroy U. Gardner, Yandell Henderson, Charles J. Imperatori, Chevalier L. Jackson, Adrian Lambert, Howard Lilienthal, Harrison S. Martland, Jonathan C. Meakins, James Alex. Miller, Charles T. Porter, Maximilian A. Ramirez, Arnold R. Rich, David Riesman, Charles Hendee Smith and Harry Wessler.

The profession generally is invited to attend. A complete program and registration blank may be obtained by addressing — Dr. Frederick P. Reynolds, the New York Academy of Medicine, 2 East 103rd Street, New York City.

The Second Annual Meeting of the American Association for the Study and Control of Rheumatic Diseases will be held at the Marlborough-Blenheim, Park Avenue Hall, Atlantic City, on June 10, 1935.

The morning session will be devoted to chronic arthritis and the afternoon to rheumatic fever.

The President is Dr. E. E. Irons, Chicago, and the Secretary-Treasurer, Dr. L. T. Swaim, Boston. Members of the Canadian Medical Association will be welcomed at the meetings.

General

Fifteenth International Physiological Congress.— According to the decision of the Fourteenth International Physiological Congress in Rome, the Fifteenth International Congress will be held in the U.S.S.R. The Congress will take place in Leningrad and Moscow, August 9 to 17, 1935.

Members of the Congress Committee: I. P. Pavlov, (Leningrad), President; L. A. Orbeli, (Leningrad), Vice-President; A. W. Palladin, (Kiev), Vice-President; I. S. Beritoff, (Tiflis), Vice-President; L. N. Fedorov, (Leningrad), General Secretary; G. W. Volborth, (Charkov), Secretary; Ch. S. Koshtojanz, (Moscow), Secretary.

The Committee will provide board, lodging, etc., for all the members of the Congress and dependent members of their families. Arrangements will be made for trips and visits to several parts of the country at reduced rates. In order to avoid any delay with visas, and to procure the best conditions of life and work for the members of the Congress, all physiologists intending to take part in the Congress are requested to enrol as soon as possible.

The membership fee: Rbls 10 = 131 Francs 34 Centimes, Gold, should be forwarded to the following address: The State Bank of the U.S.S.R., Moscow, Current Account No. 7005 of the Committee of Fifteenth International Physiological Congress. The cheque can be drawn in any currency according to the exchange rate of the day. Name and address of the sender should be given to the Bank.

Address mail concerning the Congress: The General Secretary, Leningrad, Main P. O., Box 13.

The First International Congress of Gastro-enterology. — The First International Congress of Gastro-Enterology will be held in Brussels from August 8 to 10, 1935, on the occasion of the Brussels Universal Exhibition. Physicians, surgeons, radiologists and biochemists of every country will be admitted as Active Members of the Congress.

The International Society of Gastro-Enterology will be constituted during the Congress.

In addition to an interesting scientific program, excursions have been organized to the various spas and cities exemplifying the best phases of Belgian art, to the War Front, including a complete tour of Belgium.

The fee for membership is $5.10. Cheques may be sent to Dr. Jean LeSage, 418 Sherbrooke Street East, Montreal.

The Canadian Committee is composed of Prof. E. Dubé, Honorary President, Dr. Jean LeSage, General Secretary, and Professors E. W. Archibald, P. C. Dagneau, A. LeSage, P. Letondal, J. A. Mousseau, E. Rhéaume, E. Saint-Jacques, Valin, and Vezina.

For information concerning the general organization of the Congress — reduction of railway fares in different countries and of shipping fares, hotels at Brussels, visits and excursions which will follow the Congress, members may enquire at the Agence de Voyages, "Viator-

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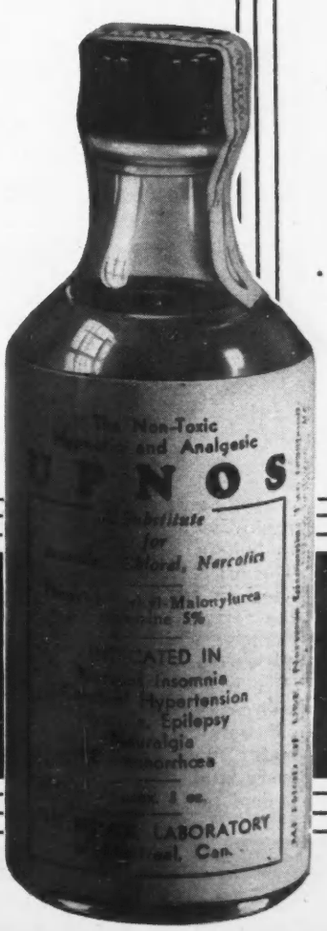

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Exprinter'', avenue du Mont Kemmel, Brussels. The General Secretary is Dr. Georges Brohee, 64, rue de la Concorde, Bruxelles.

The Canadian Federation of Medical Women is due to meet in Atlantic City at the time when the American and Canadian Medical Associations will be convening. The Executive of the American Medical Women's National Association has invited the Canadian medical women to breakfast on June 12th, at 8 a.m., at the Marlborough-Blenheim Hotel. On this occasion Dr. Madge T. Macklin, of London, Ont., will speak. Following this the annual meeting of the Federation will be held.

Book Reviews

The Biochemistry of Medicine. A. T. Cameron, D.Sc., F.R.S.C., Professor of Biochemistry, and C. R. Gilmour, M.D., C.M., F.R.C.P.(C.), Professor of Medicine, University of Manitoba. Second edition, revised; 518 pages, illustrated. Price 21s. J. & A. Churchill, London, 1935.

The present work is larger by only a few pages than the first edition, which appeared in 1933, but it has been very rigorously revised and brought up to date. The account of the endocrine system and its disorders is largely new, and some entirely new topics have made their appearance, including, one notes with pleasure, the diseases characterized by storage of glycogen or of various fats. The book is eminently suitable either for the student of biochemistry who wishes to study the applications of his science or for the internist who wishes to renew contact with the fundamental science as it exists at the present day. One or two errors have escaped notice in the revision, such as ''Heaps'' for ''Heape'' and ''Lorrain'' for ''Lorain''; ergosterol is still credited with 27 carbon atoms, instead of 28, and vitamin B_1 with three nitrogens instead of four. These are minor blemishes in an otherwise instructive and stimulating book.

Physiology in Modern Medicine. J. J. R. Macleod, M.B., LL.D., D.Sc., F.R.C.P., F.R.S., Regius Professor of Physiology in the University of Aberdeen. Seventh edition, 1154 pages; illustrated. Price $8.50. C. V. Mosby, St. Louis; McAinsh & Co., Toronto, 1935.

The physician in practice who wishes to keep abreast with the advances in physiology and the problems of animal function with their practical application in medicine will welcome this new seventh edition of a well known text-book. Prof. Macleod lived to see the work in the printer's hand. He leaves behind him a monument to his painstaking research and his ability to condense and present to the student and practitioner the essentials for his approach to the study and treatment of disease. In this edition Bard and Carter, of Hopkins, have written the chapters on the neuromuscular and central nervous system, and the circulatory system, respectively. The book is well balanced and will continue to hold a high place among text-books on physiology. The price has been reduced some three dollars, but this has been achieved to some extent by using the type of the former edition for those lines which have not been changed, with the result that many pages are marred by the variations. In fact on some pages the portions which have been reprinted without change have an appearance approaching that of bold-face type. Why continue the old worn-out illustration of the mercury sphygmomanometer with its detail lost, an instrument which every student and practitioner must use? The printing is deplorable, but the text most excellent.

Recent Advances in Endocrinology. A. T. Cameron, D.Sc., F.I.C., F.R.S.C., Professor of Biochemistry, University of Manitoba. Second edition, revised; 406 pages, illustrated. Price 15s. J. & A. Churchill, London, 1935.

Professor Cameron's admirably clear and thoroughly scientific account of experimental endocrinology well deserved the success implied in the fact that a second edition has appeared only two years after the first. In its original form, the work was rather ungenerously noticed by various reviewers, who took issue with the author on points of detail, especially with some of his attributions of priority in discovery; yet it was, and is, the only book which one could recommend to a student or a medical or scientific colleague anxious to make a general survey of the achievements of this confusing and precocious subscience. The new edition, some forty pages larger than the first, has been revised throughout, to take account of publications up to August, 1934; it is unfortunate that striking advances in our knowledge of the chemistry of the sex hormones were just too late to be included. One or two errors, such as ''Cassida'' for ''Casida'' and ''Kolm-Speyer'' for ''Kohn-Speyer'', have been noted; and a line of type has mysteriously migrated from page 143 to page 148.

Internal Medicine: Its theory and practice. Edited by John S. Musser, B.S., M.D., F.A.C.P., Professor of Medicine, Tulane University of Louisiana School of Medicine. Second edition, 1288 pages, illustrated. Price $10.00. Lea & Febiger, Phila., 1934.

In our April number of 1933 there appeared a review of the first edition of this text. Since that time the work has undergone an overhauling by the various contributors, twenty-six in number, each of whom is a professor of medicine or of one of its branches in one of seventeen American university medical schools. Each contributor is reputed to be specially interested and trained in the particular subject upon which he has written. It is superfluous to say that the fundamental promptings of this style of authorship are highly commendable. The reader has a feeling of confidence that the scissors and paste-pot have had a very minor place in the formation of the material.

The new edition purports to contain radical changes in the section on lung disease, to have acquired new sections dealing with recent ideas of the arthropods, diseases of the lymphatics, and tuberculous diseases of the urinary tract. The Diseases of the Alimentary tract have been made to include not only the *prima via* but the accessory organs of digestion. There has been also some shifting of the scenery in other classifications for which the editor is prepared to be criticized.

The index has been limited, as in the first edition, to main headings and special features with elimination of the sub-heads. This is reasonable enough, but one cannot help feeling that there has been a serious oversight when one cannot find in the index such topics as ''pulmonary infarction'', ''pulmonary thrombosis'', ''tuberculous peritonitis'', and ''sarcoma''. Moreover, the text itself seems to have been regardless of these entities, and for what reason no prefatory excuses have been vouchsafed. Amyloid disease is mentioned in different parts of the book but has no place in the index.

On page 633, reference is made to symptomatic diarrhœas as being different from others, yet the preliminary remarks would seem to imply that all diarrhœas are symptomatic. The approach to the alimentary diseases is in general rather too revolutionary to suit those who have a respectful view of achlorhydria and hyperchlorhydria and are not too well satisfied with a plain diagnosis of ''indigestion''. On page 634 under ''Diagnosis'' one would suggest as important laboratory tests in diarrhœa, the *old-fashioned* procedures of fractional gastric analysis, blood count, and basal meta-

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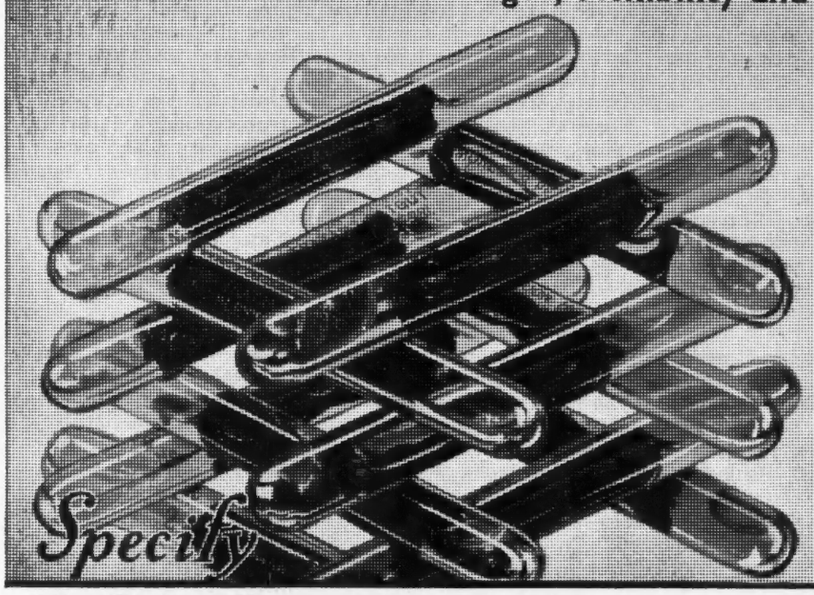

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bolism. It may be that specializing in a branch of internal medicine makes one less mindful of the other systems of the body. The addition of a section on the Allergies, in Chapter XXI, is in line with our remodelling of our ideas as to the causation of some old-time entities. A rather bright idea is also to be found in the section called "Neurologic Syndromes". The same idea of ready reference to man-named entities might be applied to other systems than the neurological.

This second edition is showing progressive revision, but in following up subjects of reference there is a great deal to be desired that in the course of later revisions will find happy placement. The third edition will be welcome when it comes.

Poliomyelitis. John F. Landon, M.D., Attending Physician, Willard Parker Hospital, New York, and Lawrence W. Smith, M.D., Pathologist, Willard Parker Hospital. 275 pages. Price $3.60. Macmillan Co., New York and Toronto, 1934.

Although many monographs on poliomyelitis have been written since this comparatively new disease began to assume epidemic proportions most of them have been of little use to the practising physician. The International Committee for the Study of Poliomyelitis have from time to time published the results of their research, from which the authors have freely drawn, and this, with their own wide experience, makes the volume under review the last word on the subject. They find the usual names given to the disease unsuitable, both clinically and pathologically, and suggest that we adopt the common European nomenclature Heine-Medin disease, after the two research workers who did most to crystallize our knowledge.

The outstanding feature of this book is the fair and concise way in which the authors sum up controversial subjects, such as convalescent serum in the treatment of the disease. As they state, "The clinical diagnosis of abortive poliomyelitis is pure guess work", and therefore the results of the serum treatment vary greatly, depending upon the imagination of the reporter. Although there are some competent investigators who still believe in the efficacy of serum, Landon and Smith have seen little to recommend it.

This virus disease, in the temperate zone, is most common between July and October, with the mortality rate higher in very young infants and in adults, the number of fatal cases being inversely proportional to the number of reported cases. As yet the modes of transmission are purely speculative theories. All we can say of the incubation period is that it is variable and probably lies between seven and ten days. It is not a disease of poverty, and nearly all the cases occurring in any epidemic are seen in the particularly well developed, "husky", type. There is, at the onset an appearance of apprehension, and the child's facial expression often resembles "the hurt and fearful look of a small dog which has received an unexpected kick".

Among the laboratory aids they find a well-marked leucocytosis with the polymorphonuclears 10 to 15 per cent above normal, and an increase of cells in the spinal fluid averaging 50 to 100.

The chapter on the after-care of the paralysis is very good and emphasizes the importance of time and hope.

The letterpress and illustrations are excellent, and this volume ranks with the classics of Heine, Medin, and Wickman.

The Preventive Aspects of Medicine. A series of lectures delivered at King's College Hospital Medical School. 376 pages. Price 10/6 net. The Lancet, Ltd., 7 Adam St., Adelphi, London, 1934.

Whoever had the idea of publishing in book form the twenty-five lectures delivered at King's College Hospital Medical School should be congratulated. Each lecture was given by a recognized authority, so that this one volume brings to the reader the present-day knowledge concerning much of the field of preventive medicine. A few years ago, the New York Academy of Medicine published as an outline of preventive medicine a somewhat similar book, to which there were twenty-one contributors. It would appear that there is an increasing demand for knowledge in this field. This book will be a welcome addition to the library of the student and the practitioner.

Surgical Applied Anatomy. Sir Frederick Treves, Bart. Ninth edition revised by C. C. Choyce, C.M.G., C.B.E., B.Sc., M.D., F.R.C.S., Professor of Surgery, University of London. 720 pages, illustrated. Price $4.00. Lea & Febiger, Philadelphia, 1934.

Few general surgical works have survived the passing of fifty years; fewer still have survived with as much vitality as Treves' Surgical Applied Anatomy. It was written by a great surgeon, and it has been cared for by a great anatomist and later by another great surgeon. With time and increase of knowledge it has inevitably been altered considerably; as Mr. Choyce remarks he has "found it difficult to preserve the anecdotal surgical anatomy of Treves' time and that of today". But it still has been regarded as a compendious, attractive and thoroughly useful book.

Surgical Diseases of the Chest. E. A. Graham, A.B., M.D., F.A.C.S., Professor of Surgery, J. J. Singer, M.D., F.A.C.P., Associate Professor of Clinical Medicine, Washington University School of Medicine, and H. C. Ballon, M.D., C.M., F.A.C.S. 1070 pages, illustrated. Price $15.00. Lea & Febiger, Philadelphia, 1935.

To write a good book covering a field of surgical therapy, such as the authors have attempted in dealing with diseases of the chest cavity and its contents, is no mean accomplishment. As they themselves stress, the completion of the study of any one portion of this book, its writing and arrangement, takes considerable time, and when it is finished there is a great deal of new work ready to be considered. Therefore, the volume cannot pretend to be complete, but represents what has been done up to the present time to cover all possible sources of information available in the literature. It is difficult to think of any condition, as, for example, neurofibroma of the pleura, that is not covered; and the case histories, illustrations, photographs and reproductions of x-ray plates, serve to make the symptoms, pathology, and treatment of the various diseases easy to follow. For detailed operative procedures reference will be required at times to special articles or journals, as it is obviously impossible to make this volume an operative surgical text-book. Deserving special mention is the treatment of the subject empyema, to which some fifty pages are devoted.

Every hospital internist will find this volume of constant value as a reference book, and no chest surgeon can well do without it. It will appeal also to the advanced intern, and especially to the staff in sanitaria for the treatment of tuberculosis, as the various therapeutic means of treatment are given with great detail and thoroughness.

Diseases of the Rectum and Colon, and Their Surgical Treatment. J. P. Lockhart-Mummery, F.R.C.S., M.A., M.B., B.C., Senior Surgeon, St. Mark's Hospital for Cancer. Second edition, 605 pages, illustrated. Price $10.50. Baillière, Tindall & Cox, London; Macmillan Co., Toronto, 1934.

This book is a record of the experience gained by the author at St. Mark's Hospital during some twenty years of practice. It makes no pretence of being an encyclopædia. The views expressed in it are the author's personal convictions, based more on observation than theory, and often helpfully dogmatic. Its greatest value

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to practical surgeons will probably be that it assembles in one volume the many valuable contributions made by Mr. Lockhart-Mummery to the field of ano-rectal surgery. Descriptions of his special instruments are given (specula, sigmoidoscope), as well as details of those operations with which his name is popularly associated (perineal excision of the rectum for cancer, sacral fixation of the rectum for prolapse, ligature and excision operations for internal piles).

In the operative treatment of fistulæ passing deep to the external sphincter the writer strongly advises against division of the sphincter at the primary operation, especially in fistulæ with a lateral opening, since, in his belief, incontinence may follow this procedure. The operation that he advocates is done in two stages: a primary wide excision of the fistulous tract, together with a comparatively large area of skin, leaving a flat open wound, but without dividing the sphincter; and a secondary operation, two weeks later, in which the sphincter is cut across. This will prevent retraction of the ends of the muscle and subsequent incontinence. The chapter on rectal cancer sets forth the author's well-known views on the desirability of the perineal operation, and contains informative paragraphs on diagnosis, indications for operation, and pre-operative and post-operative care. A list of references to British, American, and French literature is provided.

Diseases of the Mouth and Their Treatment. H. Prinz, A.M., D.D.S., M.D., D.Sc., Professor of Materia Medica and Therapeutics, T. W. Evans Museum and Dental Institute, and S. C. Greenbaum, B.S., M.D., Assoc. Professor of Dermatology and Syphilology, Graduate School of Medicine, University of Pennsylvania. 602 pages, illustrated. Price $9.00. Lea & Febiger, Philadelphia, 1935.

There are not many text-books devoted to diseases of the mouth, and it is not always easy to find information on even common conditions, such, for instance, as coated tongue, fissured tongue, etc. In this book a great deal of this scattered information is brought together, with a wealth of good illustrations. The descriptions are clear and the treatment is adequately dealt with.

We note the reference made by the authors to the confusion of aphthæ with thrush which occurs in four modern American dictionaries; aphthæ, while a generic term for certain forms of stomatitis, is to be clearly differentiated from thrush, not only by the type of lesion but by the fact that the latter is due to the *Monilia albicans*, a yeast-like organism.

Diseases of the Skin. R. L. Sutton, M.D. Sc.D., LL.D., F.R.S.(E.), Professor of Dermatology, and R. L. Sutton, Jr., A.M., M.D., L.R.C.P.(E.), Assistant in Dermatology, University of Kansas. Ninth edition, 1433 pages, illustrated. Price $13.50. C. V. Mosby Co., St. Louis; McAinsh & Co., Toronto, 1935.

In a dermatological book one naturally turns to the section on that seasoned veteran of dermatological war, eczema. But we still find that "it is not possible at this time to formulate a satisfactory definition . . . few are willing to subscribe to Walker's radical opinion that 'Eczema is a term commonly applied to any wet or scaly condition of the skin of the cause or nature of which the observer is ignorant (but) the fact remains that eczema is only a sort of dermatological scrap heap out of which certain diseases that present a characteristic and definite symptomatology are extracted'." However, the authors attempt to reassure us by saying that "it is exceedingly probable that the list will be considerably augmented in the years to come". The section on urticaria leaves one without any indication that the authors have consulted Lewis' work on the capillaries in which the pathology of wheal formation is so admirably dealt with.

The book is very well illustrated, as of course any dermatological work must be. Treatment is adequately covered and is brought up to date. The work is not outstanding, but constitutes a good modern text-book.

Synopsis of Obstetrics and Gynæcology. Aleck W. Bourne, M.A., M.B., B.Ch., F.R.C.S., Senior Obstetric Surgeon, Queen Charlotte's Hospital, London. 444 pages, illustrated. Price $4.50. John Wright & Sons, Bristol; Macmillan Co., Toronto, 1935.

This new sixth edition by the senior obstetric Surgeon at Queen Charlotte's Hospital, London, in the well-known "Synopsis Series", will be of great value to students preparing for qualifying examinations, and also to busy general practitioners who wish to bring their knowledge up to date. There is a brief account of the more elementary physiology of the sex hormones and a description of that obscure and dangerous condition, obstetric shock. Line drawings at the foot of the page serve to elucidate the text. The author is to be heartily commended for having condensed so much valuable material into a small compass.

Diseases of Children. By various authors. Third edition, edited by Hugh Thursfield, D.M., M.A., M.R.C.P., Physician, Hospital for Sick Children, and Donald Paterson, M.D., F.R.C.P., Physician to Out-Patients, Hospital for Sick Children. 1152 pages, illustrated. Price $15.00. Ed. Arnold, London; Macmillan Co., Toronto, 1934.

The third edition of this work shows a general revision both in text and illustration and a number of new contributors appear. Several new chapters are added and the reader will find the newer methods of treatment presented in attractive form. The sections on the genito-urinary system and the nose and throat illustrate well some of the recent advances in treatment since the last edition. The book presents in concise form the views of well recognized English authorities. To confine to one volume the various aspects of diseases of children is no small task, and the authors have admirably presented the essentials in diagnosis and treatment in compact, readable form. The methods of treatment are on the whole, conservative, and those that have stood the test of time receive proper emphasis. This book, as in the past, will serve as a safe guide and ready reference to the busy general practitioner and should be included in the library of every pædiatrician.

Radium and Cancer. H. S. Souttar, D.M., M.Ch., F.R.C.S., Hon. M.D., Trinity College, Dublin, Surgeon, London Hospital. 387 pages; illustrated. Price $6.25. Wm. Heinemann, London; Macmillan Co., Toronto, 1934.

The author modestly refers to his contribution as a "bird's-eye view" of the whole subject. The impression made upon the reviewer is that in range of vision and clarity of description it ranks as an admirable treatise of the present day treatment of certain types of cancer by radium.

The subject is presented under two main divisions, the first dealing with the physics of radium, the second with the clinical application of it. Thankful appreciation is due to Mr. Souttar for helping those who are more interested in the surgical uses of radium to acquire at least a working knowledge of modern atomic physics as a result of the consecutive and readable presentation of this part of his book. The chapters dealing with the therapeutic application of radium to the various types of cancer amenable to this form of treatment contain a succinct description of the different methods of procedure as well as his own conclusions. The value of the contribution is further enhanced by several appendixes and tables and a comprehensive bibliography.

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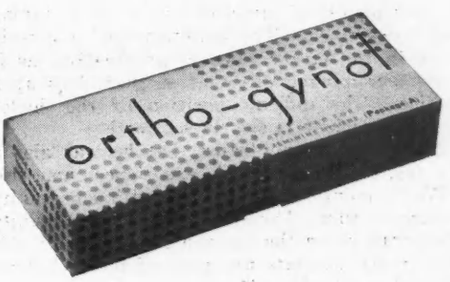

Blood Groups and Blood Transfusion. Alexander S. Wiener, A.B., M.D. 220 pages. Price $4.00. Charles C. Thomas, Springfield, and Baltimore, 1935.

This book discusses blood groups, the methods of their determinations, sources of error in their determination, their heredity, and their application in medico-legal cases. The history of transfusion, its technique, the relation of blood groups to transfusions, and the indications for and reactions to transfusion are adequately discussed. The application of statistical methods to the problems arising in the study of blood groups is dealt with in simple terms, understandable by the average physician. There is an extensive bibliography. The book is well worth while for those engaged in the study or determination of blood groups.

Dietetics for the Clinician. Milton Arlanden Bridges, B.S., M.D., F.A.C.P., Director of Medicine, Department of Correction Hospitals, New York. Second edition, thoroughly revised. 970 pages. Price $10.00. Lea & Febiger, Philadelphia, 1935.

The first edition of this work received favourable notice in these columns less than two years ago. That a new edition has already been called for indicates a gratifying reception. The new work is an excellent reference book and guide for the physician in the practical art and science of dietetics. The first part gives the reader a condensed review of the mechanics, physiology and chemistry of digestion, a summary of our knowledge of the vitamins, the classification, the structure of foods, and caloric requirements. The important part is that dealing with the dietetic management of individual diseases in adults, children and infants. In the appendix are some 200 pages of most useful tables with special and general bibliography. A most valuable work for the consulting and practising physician.

The Newcastle-upon-Tyne School of Medicine, 1834-1934. P. Grey Turner and W. D. Arnison. 224 pages, illustrated. Price 10s. net. Andrew Reid & Co., Newcastle upon Tyne, 1934.

This volume marks the centenary of the founding of a Medical School in Newcastle-upon-Tyne and traces it through various changes, including one disruption, to the present University of Durham School of Medicine. There are short biographical sketches of some of the outstanding teachers and presidents down to the Sir Thomas Oliver who is now guiding the destinies of this well known school.

Doctor Mallory. Alan Hart. 320 pages. Price $2.50. W. W. Norton & Co., New York, 1935.

A biographical novel of a physician by a physician should be of particular interest to the medical profession. As a young boy, Bob Mallory is convinced that he must be a doctor. He felt the "call" which later dominated his life to the point that when the choice had to be made as between the wife whom he loved and the people whom he served the latter won.

"Doctor Mallory" is an interesting and well-told story. The difficulties of practice in a poor fishing village are well described. The indictment of a certain type of doctor in the larger town is provocative, as is that of the commercializing effect of surgical fees upon medical practice. The difficult position of the doctor in the matter of abortions is clearly set forth.

Doctor Mallory was an idealist, but he was also a worker and a realist, for out of his experience came this decision: "We're going to experiment with community medicine. Going to turn 'The Haven' into a community hospital and operate it on the insurance principle." He also said this: "My patients are part of me and more important than the rest of me."

It would appear that the author has seen the changing conditions under which the practice of medicine cannot remain static. He has performed a useful service by presenting, in the form of a novel, the need for change and for the maintenance of professional standards by lifting medicine out of the category of competitive business.

Rats, Lice and History. Hans Zinsser. 301 pages. Price $3.00. Atlantic Monthly Press, Boston; McClelland & Stewart, Toronto, 1935.

This quite unusual work was written by Professor Zinsser, the well-known bacteriologist, as a relaxation and for his own delectation. It is fortunate that he has allowed it to appear in print for the instruction and edification of a wider public. The title itself is arresting. The rats may, possibly, pass muster, but the louse, if referred to at all has generally been spoken of in an apologetic manner and with bated breath. This latter nuisance was never much of a social climber, but, we understand, it received recognition not long ago, being referred to by name in that august assemblage, the British House of Lords! At last it has "crashed" into literature. Always content to remain in the background, it has been for centuries a power for evil, biting the hand, as it were, that fed it and gave it shelter. Now it is thoroughly unmasked.

In "Rats, Lice, and History" Professor Zinsser has written what he calls a *biography* of certain epidemic diseases of parasitic character in which rats and lice play probably the most important etiological rôle, in particular, bubonic plague and typhus fever. He shows, incidentally, how these pestilences have determined the fate of armies, have destroyed nations, and have changed the course of history—all this in a fascinating way. But we have more here than a bald scientific treatise on certain phases of epidemiology, though the essential facts are presented in a clear manner; we find Professor Zinsser's thoughts on ethnology, politics, the N.R.A., philosophy, metaphysics, and religion (not many of them here!), expressed wittily, often, and with many a sly dig or bludgeon blow at the foibles and follies of the day. Doctor Zinsser frequently refers in an apologetic way to his propensity to leave the main road for the by-path. He need not worry; it is these side issues and divagations that make his book. If you once start reading "Rats, Lice and History" you will not put it down until you have finished it.

BOOKS RECEIVED

Transactions of the American Association of Genito-Urinary Surgeons. Forty-sixth annual meeting held at Hot Springs, Virginia, May 14, 15 and 16, 1934. Vol. 27. 438 pages. Bruce Publishing Co., St. Paul and Minneapolis, 1934.

The Patient and the Weather. William F. Petersen, M.D. and Margaret E. Milliken, S.M. Vol. 2, Autonomic Dysintegration. 530 pages. Price $6.50. Edwards Brothers, Inc., Ann Arbor, Mich., 1934.

Brief Outline of Modern Treatment of Fractures. H. W. Spiers, A. B., M.D., Professor of Orthopædic and Fracture Surgery, College of Medical Evangelists, Los Angeles. 129 pages, illustrated. Price $2.00. William Wood, Baltimore, 1935.

Researches in Cancer. Part 1. Caleb Wyand G. Rohrer, B.Sc., M.D., M.A., Ph.D. 144 pages, illustrated. Price $5.00. Brenwood Printing Co., Baltimore, 1934.

Alcohol and Anæsthesia. W. Burridge, D.M., M.A., Professor of Physiology, Lucknow University. 65 pages. Price 2/6 net. Williams & Norgate, London, 1934.